University Physics I Phys 251 syllabus
Spring 2024
(4 credits)

Coreq: MATH 165

Instructor

Dr. Mila Kryjevskaia
Office: Physics, South Eng. 212C.
e-mail: mila.kryjevskaia@ndsu.edu

Office hours:

Wednesday after class: 12:00 pm - 1:00 pm
Friday before class: 10:00 am - 11:00 am
By appointment. Zoom office hours are available upon request.

Course Description

Physics 251 is a detailed introduction to Newtonian mechanics of translational and rotational motion, work, energy, power, momentum, conservation of energy and momentum, periodic motion, waves, sound, heat, and thermodynamics. There are three lectures each week with regular HW assignments and other outside the class required work.

Course goals

Students completing Physics 251 should be able to solve Newtonian mechanics problems that require *both* conceptual and mathematical understanding of the material. Students must develop qualitative and quantitative reasoning skills necessary to answer novel questions that were not explicitly discussed in class. Students must be able to provide alternative solutions, check answers for consistency, and identify mistakes in their incorrect lines of reasoning (if appropriate).

Prerequisites

Math 165 (prereq/coreq)

Class Hours

Monday, 11:00am-12.50pm, AgHill 130/132
Wednesday and Friday, 11:00am-11:50am, AgHill 130/132

Course materials

1. Textbook (optional): Halliday, D.; Resnick, R.; Walker, J. Fundamentals of Physics, any edition ed. Wiley. (full version)
2. PointSolution Web app.
3. Scientific calculator.

Course format

Phys 251 meets three times a week in a large SCALE-UP room equipped with discussion tables, whiteboards, and display monitors. A significant amount of time will be devoted to group work and class discussions. The lecture component will be reduced significantly compared to a typical lecture format. We will also use clicker questions to engage you in the learning process.

Clicker questions using PointSolution Web. All NDSU students have free access to the PointSolution license. We will use a web-based PointSolution option that does not require a special device; any device that connects to the internet should work (phone, iPad, laptop, etc). If that is an issue, please let me know. You will also need to download the app on your device. Follow a few steps described in the link below to create an account and download the app.

https://kb.ndsu.edu/page.php?id=101669

Please be prepared to use/test the PointSolution app on the first day of class.

Attendance

Attendance is not required; however, participation in discussion of in-class "clicker" questions will contribute up to 5% to the final grade. You need to answer 75% of the questions presented in class during the entire semester to receive "full" clicker questions credit (5%).

How to succeed in this class

Please check out five short videos on how people learn and effective strategies for learning.

http://www.youtube.com/playlist?list=PL85708E6EA236E3DB

The videos are created by Stephen L. Chew, a cognitive psychologist at Samford University. The videos discuss common student misconceptions about learning (memorization of facts, reading lecture notes as opposed to processing information, *etc.*). The videos also include discussions of effective strategies for academic success. There is a sequence of 5 episodes, you can watch all of them in under 30 minutes. I am extremely impressed by the videos. I think you will enjoy the videos as well. Check them out!

Memorization of material is not helpful in Physics. Your goal must be to refine your intuition (intuition that you already have!) about many physics-related situations and to make sense of how "things" work. To achieve this goal, you must be actively involved in the process of learning. Science (Physics specifically) cannot be learned by listening to an instructor explaining concepts and solving problems on a board. During the class discussion period, you are strongly encouraged to think about questions posed by an instructor, check for your understanding with your peers (If possible), and ask questions. You should feel free to ask questions any time during class.

Homework assignments

Regular web-based (LON-CAPA) HW (due approximately every 10 days). Late homework will not be accepted.

Ungraded web-based assignments

We would like to learn more about what ideas and concepts related to Phys 252 you know well and what material needs to be discussed in class at a deeper level. To help us gain this knowledge and to give you opportunities to practice applying ideas learned in class, we will ask you to complete short weekly *ungraded* assignments (15-30 min long). You are *not* expected to read or study before each assignment because we want to learn how you *think* about the material (not necessarily what you read in a textbook or whether you are correct). However, you will be expected to explain your answers or reasoning and try to answer each question included on these web-based assignments. Your effort and not the correctness of your answers will contribute 5% to your final grade. Participation in these assignments is usually beneficial for the students since they 1) give students an opportunity to recall relevant material prior to coming to class, 2) recognize what students do and do not know, and 3) practice applying new concepts prior to course exams.

A link to each web-based assignment will be emailed to you. Each assignment will also be announced in class and on Blackboard. Typically, these assignments will be open each week over the weekend, Friday – Tuesday.

Exams.

Exams will be in class.

All exams will have a mix of multiple-choice questions (you will get credit for correct answers only) and free-response questions (you will be asked to explain your reasoning and show your work; you will be given credit for partially correct answers as well). To allow for partial credit on free-response

questions, each exam question will be worth 5-7 points. However, since only percentages contribute to the calculation of your final grade in the course, only the percentage of points earned on each exam is relevant, not the absolute number of points.

We will have 3 regular exams and a final. The final exam will be comprehensive (will cover all topics discussed in the course).

Specific exam dates will be announced during the second week of the class.

Grading information

Your final grade in physics 251 will be determined on the following basis:

Homework: 40%

Exams: 50% total (one lowest exam score will be dropped; final exam score cannot be dropped; final exam contributes the same percentage to the calculation of the final grade as a regular exam)

Ungraded work, points are assigned based on student participation efforts regardless of the correctness of their responses: 10%

- In-class participation efforts (via PointSolution Web): 5%
- Ungraded assignments participation efforts: 5%

Extra credit HW problems: 3%
Extra Credit HW could be used to make up points lost due to any reason. This percentage will be added on top of your final grade in the course.

Letter Grading:
89.5 to 100% = A
79.5 to 89.4% = B
69.5 to 79.4% = C
59.5 to 69.4% = D

Health and Safety Expectations

Do not come to class if you are sick. Should any circumstances necessitate strictly online instruction, all course resources will remain accessible through Blackboard, including lecture slides and lecture recordings.

Copyright of Course Materials

According to NDSU Policy 190 on Intellectual property, recording the lectures in this course is prohibited with your own personal devices (without prior express approval from the instructor). All recordings and course materials posted in the Blackboard cannot be used for anything other than personal use for learning.

Special Considerations

Students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor as soon as possible. Extra time on exams must be requested by formal letter from the NDSU department of disability services and administered through that department.

Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance.

Academic Responsibility

All work in this course must be completed in a manner consistent with NDSU University Senate Policy, section 335: Code of Academic Responsibility and Conduct.

If you are unable to attend the class due to illness

All lecture materials, including PowerPoint slides and lecture recordings, will be posted on Blackboard. Even if you miss class, you can catch up by reviewing lecture recordings and reaching out for help if necessary.