

Physics 211 - College Physics I (3 cr)

Session: Fall 2022

Instructor: Prof. John B. Buncher

Office: South Engineering 317 & Zoom as requested

Email: john.buncher@ndsu.edu

Office Hours: MTWTh 11:00 AM – Noon, or by appointment

Class Meetings: MWF 10:00 AM – 10:50 AM

Lecture Location: AGHILL 112

Final: Tues, Dec 13, 2022, 8:00 AM, AGHILL 112

Prerequisites: MATH 105 (Trigonometry) or higher, or placement test

Course Materials

- The primary text for the course will be “College Physics: Reasoning & Relationships - 2nd Edition, Vol. 1”, by Giordano, published by Brooks/Cole.
- A “Clicker” (either the Echo360 app or logging into the PointSolutions site) for answering in-class questions
- The homework for the course will be done through LON-CAPA (http://www.ndsu.edu/physics/students/lon_capa).
- Course materials (lecture slides, handouts, solutions) will be posted on the course Blackboard page. You can log in to Blackboard at <https://blackboard.ndus.edu/>
- A scientific calculator will be required to complete homework assignments and exams.
- A #2 pencil for taking exams.

Course Description

From the NDSU Catalog Course Description: Beginning course for students without a calculus background. Includes basic principles of bodies at rest and in motion, fluids, vibrations, waves, sound, and thermodynamics.

At the most basic level, this course can be thought of as a study in motion (“mechanics”), answering the question “What happens when things interact?” We can make this question more specific: “If we know the how an object is interacting with its surroundings, what kind of motion will it have?” This branch of physics encompasses a large portion of what you experience in everyday life, and our goal will be to understand motion using a few fundamental principles.

Course Objectives

The primary goal of this course is to provide the students with an understanding of the basic principles of classical mechanics that will aid them in their everyday lives and careers as informed members of society. The students should attain a conceptual understanding and problem-solving ability such that they can readily apply their knowledge to novel problems and situations. Specifically, students shall be able to:

- Reason qualitatively & quantitatively about linear & rotational motion, forces, energy, momentum, and fluids using a few foundational dynamical and conservation principles
- Translate between a graph and its physical meaning in the contexts of motion, forces, energy, and momentum
- Apply the laws of thermodynamics to determine if a given thermodynamic process is allowed

Course Policies

COVID-Related Policies

While masks are not required as we begin the 2022 fall semester, NDSU administration has determined that faculty may request mask use in their classroom. In this class, I ask that **you wear a mask** to help protect my health and the health of your peers. If you do not wear a mask, you are welcome to watch the Zoom recording.

Please **do not come to class**

- if you are feeling ill, particularly if you are experiencing COVID-19 symptoms, or
- if you are infected, during your five-day isolation period.

You will still need to complete the assignments, exams, reading, etc. necessary to meet class learning objectives. You can complete missed work by turning in assignments when you are no longer ill, and scheduling a time to make up any missed quizzes and exams.

If you were exposed to COVID-19, please follow CDC guidance available at:

<https://www.cdc.gov/coronavirus/2019-ncov/your-health/if-you-were-exposed.html>.

If you tested positive for COVID-19, please follow CDC guidance available at:

<https://www.cdc.gov/coronavirus/2019-ncov/your-health/isolation.html>.

Free testing kits can be picked up at the NDSU Bookstore, Library or Student Health Service. Rapid and PCR testing is available at the Student Health Service by appointment Monday through Friday during regular business hours for both symptomatic and asymptomatic students.

If public health conditions and directives from NDSU administration change, I will let you know in writing the expectations for our class moving forward.

Grades

Your final grade will be determined according to the following weights and cutoffs:

Clicker Questions	5%
Reading Quizzes	5%
Weekly Homework	25%
Exams	20% each (3 exams, drop lowest)
Final	25%

A	88 %
B	78 %
C	68 %
D	58 %
F	< 58 %

Your **LOWEST** score of the **THREE MIDTERM EXAMS** will be **DROPPED**. I reserve the right to *lower* the grade cutoffs listed above, however they will not be raised.

Note that exams make up 65% of your final score! It is crucial that you prepare and study accordingly.

If you participate in 85% of all clicker questions, you will receive the full 5%. Clicker questions are **NOT** graded for correctness.

Homework

We will use the LON-CAPA on-line homework system for assignments this semester. Each week will have (roughly) 2-3 on-line Reading Quizzes and one on-line Weekly Homework due. Additionally, you are expected to read the assigned sections of the text and work any suggested problems *before* class so that you are prepared to ask and answer questions in lecture.

Late Policy: For Weekly Homework and Reading Quizzes, the deadlines are mostly there so you know how to pace yourself in the course. It is important to stay on top of assignments in order to succeed. That said, I know that “life happens”. If you need an extension, please let me know and we can usually work something out.

Out of Class Time

The university defines that a student with adequate preparation should spend 3 hours per credit on the course each week in order to earn an average grade in the course. You should aim higher than “average student, average grade”, so expect to spend more than 6.5 hours per week (3 hours per credit times 3 credits minus three 50 minute lectures) on this course each week outside of class.

Attendance & Participation

According to [NDSU Policy 333](http://www.ndsu.edu/fileadmin/policy/333.pdf) www.ndsu.edu/fileadmin/policy/333.pdf, attendance in classes is expected. Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

To succeed in this course it is crucial that you attend the lecture and prepare accordingly. In order to receive the the most out of lecture, you must arrive *on-time* and be prepared for that day’s class. Preparation includes (but is not limited to):

- Reading the assigned sections of the text
- Providing feedback in the on-line reading quizzes

- Working the assigned problems
- Bringing the text and any posted lecture slides to class

Additionally, when the class is asked a question (or asked to do something in groups), you are to make every effort to come up with an answer. In-class questions are designed to get you to think, so when answering do not worry about getting the *wrong* answer, if you knew everything already you would not need to enroll in the course!

Labs

The laboratory companion to this class is considered a separate course. Students taking the lecture are not required to enroll in the lab course. The first meetings of PHYS 211L will be held the week of August 29th.

Exams

Exams will be closed-book and taken during lecture. You are not allowed to work with other students on the exams. Any topic covered in class, the reading assignments, or the homeworks may appear on the exam. Details of the format of the exams will be covered closer to the exam time.

Missed Exam Policy: Missed will normally be given zero credit. Only official exceptions will be accepted (documented illness, family emergency, official university function, etc.).

Office Hours

You are highly encouraged to make use of Office Hours (listed on the front of the syllabus). Office Hour times may change as the semester progresses, and you will be notified if they do. If you need to meet outside of those times, email me and we should be able to work something out. During office hours, we can discuss anything that you wish (homework, grading, concepts, exams, topics of interest, etc.)

Accommodations

Any 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 and contact the **Disability Services Office** <http://www.ndsu.edu/disabilityservices/> as soon as possible.

Feedback

If you have any concerns about the course or suggestions on how it may improve, please let me know! I am happy to consider and implement student suggestions, and I have had success implementing such suggestions in previous courses.

On Academic Dishonesty

The academic community is operated on the basis of honesty, integrity, and fair play. **NDSU Policy 335: Code of Academic Responsibility and Conduct** applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the **Office of Registration and Records**. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

You are highly encouraged to work with your fellow students, and to seek out their assistance or the assistance of the instructor, in all of your studies. Working with another person is highly beneficial for both people when there is a healthy working relationship. However, whatever you turn in must be your own work and words. Copying someone else's work and turning it in as your own is a case of academic dishonesty. While we are using LON-CAPA for the homework this semester, the answers you enter still need to represent your own work. You are not permitted to collaborate with anyone else on exams.

If you have any questions about what constitutes academic dishonesty it is your responsibility to ask before the assignment is due.

Need Additional Help?

If you would like additional help outside of office hours, then you are in luck! Free individual drop-in tutoring is available in the Physics Department tutor room (South Engineering 322) and from NDSU's ACE program (http://www.ndsu.edu/studentsuccess/tutoring_schedule/). I will post the Physics Department tutor room hours as soon as they are available. Please use one of the tutoring resources if you have a large number of questions.

Advice

Here are some helpful tips for success in the course, from my own personal experience and suggestions of other professors.

1. **Work every day:** It is crucial that you keep up with the material and to develop your conceptual understanding. Working a little bit every day will get you much farther than working for a long time once a week or so. You will often need to read the problems, think about them, and then come back to them later once you've had a chance to reflect on them.
2. **Practice:** Physics cannot be learned simply by reading, attending lecture, and memorizing the pages of your physics text. The single best way to learn physics is to *do* it, by practicing via the in-class exercises, lab work, homework, the workbook, etc. This will help get you ready for the exams!
3. **Ask for Help:** Help is available through me via my office hours (or by appointment), other faculty in the department, your fellow students, and private tutoring.
4. **Read Before Lecture:** That way, you're seeing the material for the second time, and are much better prepared to ask questions on things you're having trouble understanding.

5. **Read Critically:** Ask questions and take notes! If something is not clear, make a note of it so you can ask in class. You should also be working through steps done (or omitted) in class and the text. As a friend of mine once said; “The exam will NOT ask if you agree with our solution, but will ask you to come up with your OWN solution.”
6. **Participate:** It may not seem like it, but attempting to answer the questions in class will significantly help you. Even if you don’t know the answer, thinking about what you *want* to answer will help you understand what ideas you need to spend more time on, and what specific things you need more practice with. Participate all the time!
7. **Use Time Effectively:** If you’ve been stuck on one problem for 30 minutes, switch to another one (which may cause you to think about the troublesome one in a different way), or seek assistance. That being said, do not despair if it is not obvious what to do after 5 minutes of thinking. These problems will require some extra thought.
8. **Don’t Panic:** Physics is challenging. Like anything else worthwhile, it will take practice and perseverance to succeed, but the rewards of understanding how the universe works at a deeper level are well worth it.

Additional Resources for Students

It is *normal* to feel overwhelmed at the best of times, but especially now. As a member of the NDSU community, resources are available for you should you need help in dealing with adverse reactions to things happening in the world today. A variety of resources are listed below:

For students on campus and remotely (telehealth):

Counseling Services: 701-231-7671; <https://www.ndsu.edu/counseling/>

Disability Services: 701-231-8463; <https://www.ndsu.edu/disabilityservices/>

Student Health Service: 701-231-7331; <https://www.ndsu.edu/studenthealthservice/>

Dean of Students Office: 701-231-7701; <https://www.ndsu.edu/deanofstudents/>

In a crisis or emergency situation: Call University Police: 701-231-8998

Call 9-1-1

Go to a Hospital Emergency Room Go to Prairie St. Johns for a Needs Assessment: 701-476-7216 (510 4th St. S.)

Call the FirstLink Help Line: 1-800-273- TALK (8255) or 2-1-1

Call Rape and Abuse Crisis Center: 701-293-7273

Course Schedule

The following schedule is tentative, and I reserve the right to change it to benefit student learning as the semester progresses. If the exam dates need to be changed, I will notify you at least one week ahead of the new exam date.

Date	Topic	Reading Covered	Homework Due
M 8/22	No Class	-	-
W 8/24	Introduction & Sig Figs	-	-
F 8/26	Units, Algebra, Trig	1.1 – 1.5	-
M 8/29	Trigonometry & Vectors	1.6 – 1.8	HW 1 Due (Tues 8/30)
W 8/31	Vector Components, Displacement	2.1 – 2.2	-
F 9/02	Velocity	2.2	-
M 9/05	No Class – Labor Day	-	HW 2 Due (Tues 9/06)
W 9/07	Acceleration	2.2	-
F 9/09	From Velocity to Displacement	2.3 – 2.5	-
M 9/12	Uniform 1-D Motion & Kinematics	3.1	HW 3 Due (Tues 9/13)
W 9/14	Kinematics of Free-fall	3.2, 3.4	-
F 9/16	Forces, Identifying Forces, FBDs	-	-
M 9/19	Friction & FBDs	3.3, 3.5, 3.6	HW 4 Due (Tues 9/20)
W 9/21	Tension & Statics	3.7 – 3.8, 4.1	-
F 9/23	Exam 1	-	-
M 9/26	Statics (2D) & Projectile Motion	4.1, 4.2	HW 5 Due (Tues 9/27)
W 9/28	Newton's 2nd Law & Tilted Axes	4.4	-
F 9/30	Newton's Laws & Multiple Objects	4.4	-
M 10/03	Reference Frames & Human Ear	4.3, 4.5	HW 6 Due (Tues 10/04)
W 10/05	Uniform Circular Motion	5.1 – 5.2	-
F 10/07	Apparent Weight	5.3	-
M 10/10	Gravitation & Weight	5.3	HW 7 Due (Tues 10/11)
W 10/12	Work & Kinetic Energy	6.1 – 6.2	-
F 10/14	Work, Kinetic Energy, Potential Energy	6.3 – 6.4	-
M 10/17	System Choice, Power, & Nonconservative Forces	6.5 – 6.8	HW 8 Due (Tues 10/18)
W 10/19	Momentum, Force, & Impulse	7.1 – 7.2	-
F 10/21	Exam 2	-	-
M 10/24	Conservation of Momentum, Collisions	7.3 – 7.4	HW 9 Due (Tues 10/25)
W 10/26	Explosions & Center of Mass	7.5 – 7.6	-
F 10/28	Rotational Kinematics	8.1 – 8.2	-
M 10/31	Angular & Tangential Acceleration	8.1 – 8.2	HW 10 Due (Tues 11/01)
W 11/02	Torque & Statics	8.2, 8.3	-
F 11/04	Torque & Statics cont.	-	-
M 11/07	Moment of Inertia	8.4	HW 11 Due (Tues 11/08)
W 11/09	Exam 3	-	-
F 11/11	No Class – Veteran's Day	-	-
M 11/14	Angular Dynamics	8.5, 8.6	-
W 11/16	Rotational Energy	9.1, 9.2	-
F 11/18	Rot. & Trans. Motion	-	-
M 11/21	Angular Momentum	9.3	HW 12 Due (Tues 11/22)
W 11/23	No Class - Fall Break	-	-
F 11/25	No Class - Fall Break	-	-
M 11/28	Pressure, Density, Fluids	10.1 – 10.2	HW 13 Due (Tues 11/29)
W 11/30	Hydraulics & Buoyancy	10.3 – 10.4	-
F 12/02	Fluids in Motion	10.5 – 10.6	-
M 12/05	Temperature, Heat, 0th Law	14.1 – 14.3, 16.1 – 16.3	HW 14 Due (Tues 12/06)
W 12/07	Efficiency, Heat Engines & Pumps	16.5 – 16.6	-
F 12/09	Entropy	16.7	HW 15 Due (Mon 12/16)
T 12/13	Final Exam - 8:00 AM – 10:00 AM	-	-