

PHYS 251

University Physics I

Spring 2022

Class #10741 (4 credit hours)

Bulletin: Newtonian mechanics of translational and rotational motion, work, energy, power, momentum, conservation of energy and momentum, periodic motion, waves, sound, heat, and thermodynamics.

Objectives: We will explore the principles of mechanics and thermodynamics (space, time, mass, inertia, force, velocity, acceleration, momentum, work, energy, oscillations, waves, heat, entropy, and more) to solve practical problems and examine the physical basis of technologies surrounding us. Along the way, we will learn how physicists view the world, and develop problem-solving skills of value in any career.

Prerequisite: MATH 165 Calculus I (differential and integral calculus is needed)

Instructor: Andrei Kryjevski, Associate Professor Department of Physics
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Classes: MWF 11:00-11:50 am, M 12:00-12:50 pm, A. G. Hill (STEM) 130/132

Student Help Hours: Wednesday, 12:15 – 1:30 pm (SE 318D or via zoom), or by appointment

To succeed: Attend classes, invest two hours out of class per hour in class, seek help!

Textbook: Halliday, Resnick, Walker, Fundamentals of Physics, 11th ed. (Wiley, 2018)

Evaluation:	Homework Assignments	200 points
	Midterm Exams (in person)	100 points each
	Final Exam (in person)	200 points

Correct responses to 90% of the homework problems will earn the maximum 200 pts. To best prepare for exams, however, I recommend attempting all homework problems. I encourage collaborative discussion of *methods and strategies* for solving problems. Your final grade will be based on homework (200 pts), your best 2 out of 3 midterm exam scores (200 pts), your final exam score (200 pts). Classroom participation will include conceptual questions using ABCD cards.

Grades: A: 90-100%; B: 80-89.9%; C: 70-79.9%; D: 60-69.9%; F: < 60%

Communication: Weekly homework will be posted on the LON-CAPA homepage:
http://www.ndsu.edu/physics/lon_capa

Follow the login instructions to access our course and mind the assignment deadlines.

Announcements and notes will be posted on Blackboard: <https://bb.ndsu.nodak.edu>

Main Topics and Preliminary Timetable

Chapter 1	Measurement	Jan 10-14
Martin Luther King, Jr. Day	no class	Jan 17
Chapter 2	Motion Along a Straight Line	Jan 17-21
Chapter 3	Vectors	Jan 24-28
Chapter 4	Motion in 2 and 3 Dimensions	Jan 31- Feb 4
Chapter 5	Force and Motion I	Feb 7-11
Midterm Exam 1	Covering Chapters 1-4	Wed, Feb 16
Chapter 6	Force and Motion II	Feb 14-18
Presidents' Day	no class	Feb 21
Chapter 7	Kinetic Energy and Work	Feb 21-25
Chapter 8	Potential Energy and Conservation of Energy	Feb 28- Mar 4
Chapter 9	Center of Mass, Momentum	Mar 7-11
Spring Break	no classes	Mar 14-18
Chapter 10	Rotational Motion	Mar 21-25
Midterm Exam 2	Covering Chapters 5-9	Wed, Mar 30
Chapter 11	Rolling, Torque, and Angular Momentum	Mar 28 - Apr 1
Chapter 12	Equilibrium and Elasticity	Apr 4-8
Chapter 13	Gravitation	Apr 11-15
Spring Recess	no class	Apr 15, 18
Chapter 14	Fluids	Apr 18-22
Midterm Exam 3	Covering Chapters 10-14	Wed, Apr 27
Chapters 15-17	Oscillations and Waves	Apr 25-29
Chapters 18-20	Thermodynamics: Heat, 1 st Law, Entropy and the 2 nd Law	May 2-6
Final Exam	Comprehensive	Thu, 5/12, 8 AM

Academic Honesty and Special Needs:

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.

Any students with disabilities or special needs, who need accommodations in this course, are invited to share concerns or requests with the instructor and to contact the Disability Services Office (www.ndsu.edu/disabilityservices) as soon as possible.

COVID-19 Related Information

Communication

Course-related information will be communicated primarily during our class meetings. Reminders and notifications of any schedule changes will be communicated through NDSU email and posted on the Blackboard announcements page.

Your NDSU email address is the official route for course-related information.

Office hours will be conducted in person and via Zoom (at times to be announced).

If you have any technology concerns, please contact the IT Help Desk:

ndsu.helpdesk@ndsu.edu 701-231-8685 (option 1)

Submission of Homework and Posting of Grades

Homework assignments will be submitted on the LON-CAPA homepage:

http://www.ndsu.edu/physics/lon_capa

Grades will be posted on our Blackboard course homepage.

Copyright of Course Materials

Recording any class meetings with your own personal devices is strictly prohibited. See NDSU [Policy 190](#) on Intellectual Property.

Health and Safety Expectations

Information on COVID-19 and NDSU's response:

https://www.ndsu.edu/police_safety/covid_19_preparedness_and_response/

I encourage all students to attend class meetings in person. According to NDSU policy and CDC guidelines, when in the classroom, you must properly wear a face covering (covering both the mouth and nose) for the entire class. Wearing a face covering helps reduce the risk to others in case you are infected but do not have symptoms, and also

may protect you from infection. *Research studies show that even if vaccinated you can become infected and transmit the virus to others.*

If you fail to properly wear a face covering, you will not be admitted to the classroom. However, you may choose to participate remotely and synchronously via Zoom (see HyFlex options below).

Students who cannot wear a face covering due to a medical condition or disability may seek accommodation through Disability Services:

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

Disinfecting supplies are provided for you to disinfect your learning space. You may also use your own disinfecting supplies.

Whenever possible, observe physical distancing guidelines, maintaining 2 m separation from others. Avoid congregating around the classroom entrance before or after class.

In accordance with NDSU [Policy 601](#), failure to comply with instructions, including this syllabus, may be handled according to the Code of Student Conduct resolution process and may result in disciplinary sanctions.

Food and drink are not allowed in class except with a documented accommodation through Disability Services.

Do not come to class if you are sick. Please protect your health and the health of others by staying home, where you may participate remotely. For information on COVID-19, symptoms, testing, and steps to stay healthy see

https://www.ndsu.edu/studenthealthservice/covid_19/

Do not come to class if you have been exposed to individuals who tested positive for COVID-19 and/or you have been notified to self-quarantine due to exposure.

If you are unable to attend class at the scheduled time due to illness or exposure, email me promptly for alternate arrangements, including accommodations and extensions.

If you are absent from class as a result of a COVID-19 diagnosis or quarantine, you will be able to participate in class remotely (see HyFlex Options below).

HyFlex Options

Resource for students on HyFlex instruction, compiled by IT: <https://kb.ndsu.edu/learn>

If you are at high risk of contracting COVID-19 (or of infecting someone at high risk), you have the option of attending classes remotely via Zoom. You may opt to do so at the beginning of the semester or as the need arises during the semester.

To participate in HyFlex instruction remotely, you must have access to the requisite technology, including a laptop or computer with a functioning microphone, speakers (or headphones) and webcam, as well as reliable internet access.

Additional Resources for Students

As a valued member of the NDSU community, you have access to resources should you need help in dealing with adverse reactions to things happening in the world today:

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

For physical health crises: Go to a Hospital Emergency Room

For mental health crises: Go to Prairie St. John's for a Needs Assessment

510 4th St. S, Fargo (701-476-7216)

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

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