PHYS 251 University Physics I Spring 2025

Class #32440 (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, if time allows, of 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 the homework problems will earn the maximum 200 pts.
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 15-17
Martin Luther King, Jr. Day	no class	Jan 20
Chapter 2	Motion Along a Straight Line	Jan 20-24
Chapter 3	Vectors	Jan 27-31
Chapter 4	Motion in 2 and 3 Dimensions	Jan 30-Feb 3
Chapter 5	Force and Motion I	Feb 3-7
Midterm Exam 1	**Covering Chapters 1-4**	**Wed, Feb 12**
Chapter 6	Force and Motion II	Feb 10-14
Presidents' Day	no class	Feb 17
Chapter 7	Kinetic Energy and Work	Feb 17-21
Chapter 8	Potential Energy and Conservation of Energy	Feb 24-28
Chapter 9	Center of Mass, Momentum	Mar 3-7
Spring Break	no classes	Mar 10-14
Chapter 10	Rotational Motion	Mar 17-21
Midterm Exam 2	**Covering Chapters 5-9**	**Wed, Mar 26**
Chapter 11	Rolling, Torque, and Angular Momentum	Mar 24-28
Chapter 12	Equilibrium and Elasticity	Mar 31-Apr 4
Chapter 13	Gravitation	Apr 7-11
Spring Recess	no class	Apr 18, 21
Chapter 14	Fluids	Apr 14-18
Midterm Exam 3	**Covering Chapters 10-14**	**Wed, Apr 23**
Chapters 15-17	Oscillations and Waves	Apr 21-25
Chapters 18-20	Thermodynamics: Heat, 1st Law, Entropy and the 2nd Law	Apr 28-May 9
Final Exam	**Comprehensive**	**Mon, 5/12, 1 PM**

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.*

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

Homework and exam scores will be posted on our LON-CAPA 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

I encourage all students to attend class meetings in person.

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.

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

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