



Advanced Physics I PHYS 2425.881 TR

Course Syllabus: Summer 1 2025

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Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Online
	10:00 – 11:00 6:00 – 8:30	10:00 – 11:00 6:00 – 8:30	10:00 – 11:00 6:00 – 8:30	10:00 – 11:00 6:00 – 8:30	10:00 – 11:00 6:00 – 8:30	10:00 – 11:00

The information contained in this syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

Course Description: Four credit hours. This course is a calculus-based physics course intended for students majoring in computer science, engineering, mathematics, physics, or related fields of study. Topics include 1-D motion, 2-D motion, rotational motion, Newton's Laws, energy, momentum, equilibrium, gravity, oscillatory motion, waves, and heat.

Prerequisite(s): MATH 2413

Required Textbook(s):

This course will utilize Webassign online resources for homework and exams. Access to the assignments and the electronic copy of the textbook Serway and Jewett, *Physics for Scientists and Engineers*, 10th Edition, Cengage Learning, Stamford, CT, 2018 is provided by access to Webassign on the internet.

Publisher: Cengage Learning

ISBN Number: 978-1-337-55327-8

Calculator: You will need a scientific calculator or graphing calculator for this class.

Required Computer Literacy Skills: You will need to be able to navigate Blackboard and Webassign to access your online course work.

Student Learning Outcomes:

Upon successful completion of the lecture portion of this course, students will:

2425.1 Determine the components of linear motion (displacement, velocity, and acceleration) and especially motion under conditions of constant acceleration.

2425.2 Solve problems involving forces and work.

2425.3 Apply Newton's Laws to physical problems.

2425.4 Identify the different types of energy.

- 2425.5 Solve problems using principles of conservation of energy.
- 2425.6 Define the principles of impulse, momentum, and collisions.
- 2425.7 Use principles of impulse and momentum to solve problems.
- 2425.8 Determine the location of the center of mass and center of rotation for rigid bodies in motion.
- 2425.9 Discuss rotational kinematics and dynamics and the relationship between linear and rotational motion.
- 2425.10 Solve problems involving rotational and linear motion.
- 2425.11 Define equilibrium, including the different types of equilibrium.
- 2425.12 Discuss simple harmonic motion and its application to real-world problems.
- 2425.L1 Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.
- 2425.L2 Conduct basic laboratory experiments involving classical mechanics.
- 2425.L3 Relate physical observations and measurements involving classical mechanics to theoretical principles.
- 2425.L4 Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.
- 2425.L5 Design fundamental experiments involving principles of classical mechanics.
- 2425.L6 Identify appropriate sources of information for conducting laboratory experiments involving classical mechanics.

Core Curriculum Purpose and Objectives:

Through the core curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world; develop principles of personal and social responsibility for living in a diverse world; and advance intellectual and practical skills that are essential for all learning.

Courses in the foundation area of mathematics focus on quantitative literacy in logic, patterns, and relationships. In addition, these courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

Program Student Learning Outcomes:

Critical Thinking Skills

- CT.1** Students will demonstrate the ability to 1) analyze complex issues, 2) synthesize information, and 3) evaluate the logic, validity, and relevance of data.

Communication Skills

- CS.1** Students will effectively develop, interpret and express ideas through written communication.

Empirical and Quantitative Skills

- EQS.1** Students will manipulate numerical data or observable facts by organizing and converting relevant information into mathematical or empirical form
- EQS.2** Students will analyze numerical data or observable facts by processing information with correct calculations, explicit notations, and appropriate technology.

EQS.3 Students will draw informed conclusions from numerical data or observable facts that are accurate, complete, and relevant to the investigation.

Teamwork

TW.2 Students will work with others to support and accomplish a shared goal.

Evaluation/Grading Policy:

Homework assignments (via Webassign) and quizzes (administered through Blackboard) will represent 25% of your total grade. Laboratory work utilizing the purchased lab kit will represent 15% of your grade. There will be 3 unit exams with the 3rd exam administered during the final exam window. The average of the exams will represent 60% of your final grade. The exams will utilize the built in Webassign lockdown browser during administration. The lockdown browser is used for the introductory assignment to allow you the opportunity to download the lockdown browser prior to the first exam that requires it.

Homework	15%
Quizzes	10%
Lab Grade	15%
Exams (3)	<u>60%</u>
	100%

The letter grading system is: A (90-100%), B (80-89%), C (70-79%), D (60-69%), F (0-59%).

Online homework assignments are graded exercises posted on Webassign. Homework problems can be reworked up to five times with decreasing credit for each submission. The last grade earned for each homework assignment will be posted for the final grade. There are no make-up assignments.

Quizzes are short knowledge check problems combining multiple topics. These are administered through Blackboard. See the Quiz Schedule posted under the “Quizzes” tab on the Blackboard content page.

Online exams are each available on Webassign at scheduled times. Two attempts are allowed with decreasing credit for each individual exam question, but only one submission is allowed for each online exam. Exams have a three hour time limit and must be completed during the testing window during one session. The built in Webassign Lockdown Browser is utilized for exam administration. Course averages will be updated in Blackboard after each exam.

Course Outline:

Chapter 2: Motion in One Dimension

Chapter 3: Vectors

Chapter 4: Motion in Two Dimensions

Chapter 5: Laws of Motion

Chapter 6: Circular Motion and Other Applications of Newton’s Laws

Exam 1

Chapter 7: Energy of a System

Chapter 8: Conservation of Energy

Chapter 9: Linear Momentum and Collisions

Chapter 10: Rotation of a Rigid Object About a Fixed Axis

Exam 2

Chapter 13: Universal Gravitation

Chapter 15: Oscillatory Motion

Chapter 16 / 17: Wave Motion / Superposition and Standing Waves

Exam 3

NTCC Academic Honesty Statement:

"Students are expected to complete course work in an honest manner, using their intellects and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. NTCC upholds the highest standards of academic integrity. This course will follow the NTCC Academic Honesty policy stated in the Student Handbook."

Academic Ethics

The college expects all students to engage in academic pursuits in a manner that is beyond reproach. Students are expected to maintain complete honesty and integrity in their academic pursuit. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. Refer to the student handbook for more information on this subject.

ADA Statement:

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to arrange an appointment with a College counselor to obtain a Request for Accommodations form. For more information, please refer to the NTCC Catalog or Student Handbook.

Family Educational Rights And Privacy Act (FERPA):

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered "eligible students." In essence, a parent has no legal right to obtain information concerning the child's college records without the written consent of the student. In compliance with FERPA, information classified as "directory information" may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student's name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

6 Drop Rule:

Students who enrolled in Texas public institutions of higher education as first-time college students during the Fall 2007 term or later are subject to section 51.907 of the Texas Education Code, which states that an institution of higher education may not permit a student to drop (withdraw with a grade of "W") from more than six courses. This six-course limit includes courses that a transfer student has previously dropped at other Texas public institutions of higher education if they fall under the law. Students should be sure they fully understand this drop limit before they drop a course. Please visit the admissions office or counseling/advising center for additional information and assistance.

Other Course Policies:

The college's official means of communication is via your campus email address. I will use your campus email address and Blackboard to communicate with you outside of class. Make sure you keep your campus email cleaned out and below the limit so you can receive important messages.

Tentative Course Timeline (*note* instructor reserves the right to make adjustments to this timeline at any point in the term):

Chap.	Title	Week	Key Due Dates*
2	Motion in One Dimension	1	See Webassign
3	Vectors	1 - 2	See Webassign
4	Motion in Two Dimensions	1 -2	See Webassign
5	Laws of Motion	2	See Webassign
6	Circular Motion and Other Applications of Newton's Laws	3	See Webassign
	Exam #1		6/18/25
7	Energy of a System	3	See Webassign
8	Conservation of Energy	3	See Webassign
9	Linear Momentum and Collisions	4	See Webassign
10	Rotation of a Rigid Object About a Fixed Axis	4	See Webassign
	Exam #2		6/27/25
13	Universal Gravitation	4	See Webassign
15	Oscillatory Motion	5	See Webassign
16	Wave Motion		See Webassign
17	Superposition and Standing Waves		See Webassign
	Exam #3		7/9/25

**This calendar will be adjusted to the needs of the course. Changes will be based on the course progress. The exam dates could be moved one or two days up or down. The Final Exam date is fixed and will not change.*