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College Physics I

North Carolina Agricultural and Technical State University

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NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

COURSE SYLLABUS

College Name: College of Science and Technology
Department Name: Physics
Course Name: College Physics I

COURSE INFORMATION

- Course Number/Section: PHYS 225
- Term:
- Semester Credit Hours: 3
- Times and Days:
- Class Location:

INSTRUCTOR CONTACT INFORMATION

- Instructor:
- Office Location:
- Office Phone:
- Email Address:

Faculty must notify students of the approximate time and method they can expect to receive an answer to all communications (e.g., email, phone, course messages). Excluding holidays, the response should be provided within 48 hours.

If there's a graduate teaching assistant assigned to work with this course, please include their names also.

STUDENT HOURS

These are times students may visit the professor without an appointment to request the assistance they need.

NOTE: Students are responsible for reading, understanding, and following the syllabus.

: AM ☐ / PM ☐ – : AM ☐ / PM ☐

Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐

COURSE PREREQUISITES

Course Syllabus (rev 05-15-20 by the Extended Campus)

COURSE DESCRIPTION

This is an algebra-based course. No calculus is used. The course is a study of fundamental principles of Newtonian mechanics, heat, and thermodynamics.

STUDENT LEARNING OBJECTIVES/OUTCOMES (SLO)

Learning outcomes should be specific, measurable, and focused on the content knowledge the students are expected to master and not what the faculty will teach.

If the course is a General Education Course, the SLO should be listed and labeled as "General Education."

- SLO 1: Students will demonstrate knowledge of kinematics by solving problems class participation and investigation of real life applications of the physical concepts. They will be able to use vector algebra in solving problems. They will distinguish kinematics in one and two dimensions and rotational kinematics
- SLO 2: Students will demonstrate knowledge of laws of motion in describing motion in one dimension and rotational motion and by solving problems class participation and investigation of real life applications of the physical concepts. Understand conservation laws: Linear momentum and angular momentum
- SLO 3: Students will demonstrate knowledge of using the laws of motion to explain behavior of gasses atmospheric phenomena, fluid flow by solving problems class participation and investigation of real life applications of the physical concepts.
- SLO 4: Students will demonstrate knowledge the different forms of energy and the laws of conservation of energy by solving problems class participation and investigation of real life applications of the physical concepts.
- SLO 5: Students will demonstrate knowledge periodic motion, elastic energy and different forms waves and their applications for example in seismology acoustics etc. By solving problems class participation and investigation of real life applications of the physical concepts.6.Students will demonstrate knowledge Temperature, Heat as a form of Energy and laws of thermodynamics and understand how they are applied in steam engines and refrigeration by solving problems class participation and investigation of real life applications of the physical concepts.

REQUIRED TEXTBOOKS AND MATERIALS

Any course-level subscriptions and tools linked in Blackboard Learn learning management system (LMS) should be listed here. The Blackboard LMS must have links to their student data privacy statement.

REQUIRED TEXTS:

Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons.

REQUIRED MATERIALS:

SUGGESTED COURSE MATERIALS

SUGGESTED READINGS/TEXTS:

SUGGESTED MATERIALS:

GRADING POLICY

ASSIGNMENTS AND GRADING POLICY

94% and above	A		76% - 74%	C
93% - 90%	A-		73% - 70%	C-
89% - 87%	B+		69% - 67%	D+
86% - 84%	B		66% - 64%	D
83% - 80%	B-		63% - 60%	F
79% - 77%	C+			

For GRADUATE COURSES: See 2019-2020 Graduate Catalog p.38 for graduate grading scale and Non-Graded Courses

GRADING ALLOCATION

Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows: *[Faculty, please adjust according to your course.]*

Category	# of Activities	Percentage Grade Weight
Assignment	15	20%
Synchronous Session	15	10%
Test	3	45%
Discussion Board	15	5%
Final Exam	1	20%
Total		100%

COURSE POLICIES

USE OF BLACKBOARD AS THE LEARNING MANAGEMENT SYSTEM

Blackboard is the primary online instructional and course communications platform. Students can access the course syllabus, assignments, grades, and learner support resources. Students are encouraged to protect their login credentials, complete a Blackboard orientation, and log in daily to the course.

Note: Uploading assignments through Blackboard presents a challenge for Chromebook users in locating the files for submission. If you use a Chromebook, please be sure you also have access to a Mac computer or Windows computer so you can fully participate in your Blackboard class. For more information about student computer recommendations, please visit <https://hub.ncat.edu/administration/its/computer-recommendations.php>.

MAKE-UP EXAMS

See << Update Academic Year >> *Undergraduate Bulletin*:

<https://www.ncat.edu/provost/academic-affairs/bulletins/index.php>

For GRADUATE STUDENTS: See 2019-20 Graduate Catalog p. 54
EXTRA CREDIT

LATE WORK

SPECIAL ASSIGNMENTS

For GRADUATE STUDENTS: FAILING TO MEET COURSE REQUIREMENTS (Graduate Catalog p.40)

For GRADUATE STUDENTS: CLASS ATTENDANCE (see 2019-20 Graduate Catalog p. 53-54)

Students are expected to attend class and participate on a regular basis in order to successfully achieve course learning outcomes and meet federal financial aid requirements ([34 CFR 668.22](#)). Class attendance in online courses is defined as active participation in academically-related course activities. Active participation may consist of course interactions with the content, classmates, and/or the instructor. Examples of academically-related course activities include, but are not limited to:

- Completing and submitting assignments, quizzes, exams, and other activities within Blackboard or through Blackboard (3rd-party products).
- Participating in course-related synchronous online chats, discussions, or meeting platforms such as Blackboard Collaborate in which participation is tracked.

CLASSROOM CITIZENSHIP

Courtesy, civility, and respect must be the hallmark of your interactions.

COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT

North Carolina A&T State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act (ADAAA) and Section 504 of the Rehabilitation Act. If you need an academic accommodation based on the impact of a disability, you must initiate the request with the Office of Accessibility Resources (OARS) and provide documentation in accordance with the Documentation Guidelines at N.C. A&T. Once documentation is received, it will be reviewed. Once approved, you must attend a comprehensive meeting to receive appropriate

and reasonable accommodations. If you are a student registered with OARS, you must complete the Accommodation Request Form to have accommodations sent to faculty.

OARS is located in Murphy Hall, Suite 01 and can be reached at 336-334-7765, or by email at accessibilityresources@ncat.edu. Additional information and forms can be found on the internet at <https://www.ncat.edu/provost/academic-affairs/accessibility-resources/index.php>.

Please note: Accommodations are not retroactive and begin once the Disability Verification Form is provided to faculty.

TITLE IX

North Carolina A&T State University is committed to providing a safe learning environment for all students—free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are inconsistent with the university’s mission and core values, violates university policies, and may also violate federal and state law. Faculty members are considered “Responsible Employees” and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit the Title IX website to access information about university support and resources. If you would like to speak with someone confidentially, please contact Counseling Services at 336-334-7727 or the Student Health Center at 336-334-7880.

TECHNICAL SUPPORT

If you experience any problems with your A&T account, you may call Client Technology Services (formerly Aggie Tech Support and Help Desk) at 336-334-7195, or visit <https://hub.ncat.edu/administration/its/dept/ats/index.php>.

FIELD TRIP POLICIES / OFF-CAMPUS INSTRUCTION AND COURSE ACTIVITIES

If applicable:

Off-campus, out-of-state, foreign instruction, and activities are subject to state law and university policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at <https://www.ncat.edu/campus-life/student-affairs/index.php>.

STUDENT HANDBOOK

<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

STUDENT TRAVEL PROCEDURES AND STUDENT TRAVEL ACTIVITY WAIVER

https://hub.ncat.edu/administration/student-affairs/staff-resources/student_activity_travel_waiver.pdf

OTHER POLICIES (e.g., Copyright Guidelines, Confidentiality, etc.)

STUDENT HANDBOOK

<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

[Graduate Catalog](#)

SEXUAL MISCONDUCT POLICY

<https://www.ncat.edu/legal/title-ix/sexual-harassment-and-misconduct-policies/index.php>

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

<https://www.ncat.edu/registrar/ferpa.php>

STUDENT COMPLAINT PROCEDURES

<https://www.ncat.edu/current-students/student-complaint-form.php>

STUDENT CONDUCT AND DISCIPLINE

North Carolina A&T State University has rules and regulations that govern student conduct and discipline meant to ensure the orderly and efficient conduct of the educational enterprise. It is the responsibility of each student to be knowledgeable about these rules and regulations.

Please consult the following about specific policies such as academic dishonesty, cell phones, change of grade, disability services, disruptive behavior, general class attendance, grade appeal, incomplete grades, make-up work, student grievance procedures, withdrawal, etc.:

- Undergraduate Bulletin
<https://www.ncat.edu/provost/academic-affairs/bulletins/index.php>
- Graduate Catalog
<https://www.ncat.edu/tgc/graduate-catalog/index.php>
- Student Handbook
<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

ACADEMIC DISHONESTY POLICY

Academic dishonesty includes but is not limited to the following:

1. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty;
2. Plagiarism (unauthorized use of another's words or ideas as one's own), which includes but is not limited to submitting exams, theses, reports, drawings, laboratory notes or other materials as one's own work when such work has been prepared by or copied from another person;
3. Unauthorized possession of exams or reserved library materials; destroying or hiding source, library or laboratory materials or experiments or any other similar actions;
4. Unauthorized changing of grades, or marking on an exam or in an instructor's grade book or such change of any grade record;
5. Aiding or abetting in the infraction of any of the provisions anticipated under the general standards of student conduct;
6. Hacking into a computer and gaining access to a test or answer key prior to the test being given. N.C. A&T reserves the right to search the emails and computers of any student suspected of such computer hacking (if a police report of the suspected hacking was submitted prior to the search); and
7. Assisting another student in violating any of the above rules.

A student who has committed an act of academic dishonesty has failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action, but may also affect the evaluation of a student's level of performance. Any student who commits an act of academic dishonesty is subject to disciplinary action.

In instances where a student has clearly been identified as having committed an act of academic dishonesty, an instructor may take appropriate disciplinary action, including loss of credit for an assignment, exam, or project; or awarding a grade of "F" for the course, **subject to review and endorsement by the chairperson and dean.**

For GRADUATE STUDENTS: Reference for academic dishonesty – 2010-2020 Graduate Catalog, p.58-59

For GRADUATE STUDENTS: STUDENT RELIGIOUS OBSERVANCE (see Graduate Catalog, p.55)

ASSIGNMENTS AND ACADEMIC CALENDAR

Include topics, reading assignments, due dates, exam dates, withdrawal dates, pre-registration and registration dates, all holidays, and convocations.*

THE WEEK OF MM/DD/YY	SUBJECT	UNIT LEARNING OUTCOMES (ULO)	READING IN TEXT, ACTIVITY, HOMEWORK, EXAM
	Unit 1: Introduction to Vectors and Kinematics	ULO 1: Explain units of measurement (SLO 1) ULO 2: Explain vector algebra (SLO 1) ULO 3: Evaluate vector algebra in kinematics: definition of displacement and velocity (SLO 1)	1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 1: Introduction and Mathematical Concepts b. Chapter 2: Kinematics in One Dimension 2. Complete: Assignment #1 (ULO 1-3) 3. Complete: Discussion Board #1 (ULO 1-3)
	Unit 2: Acceleration and Kinematics in One-and Two-Dimensions	ULO 1: Definition and explain acceleration (SLO 1) ULO 2: Evaluate kinematics equations in one-dimension horizontal (SLO 1) ULO 3: Evaluate Kinematics in two-dimension under the action of gravity (SLO 1)	1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 2: Kinematics in One-Dimension b. Chapter 3: Kinematics in Two-Dimensions 2. Complete: Assignment #2 (ULO 1-3) 3. Complete: Discussion Board #2 (ULO 1-3)
	Unit 3: Projectile	ULO 1: Evaluate two-	1. Read Textbook: Cutnell, J.

	Motion and Uniform Circular Motion	dimensional kinematics (SLO 1) ULO 2: Explain projectile motion (SLO 1) ULO 3: Explain circular motion (SLO 1) ULO 4: Explain relative motion (SLO 1)	D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 3: Kinematics in Two-Dimensions b. Chapter 5: Dynamics of Uniform Circular Motion 2. Complete: Assignment #3 (ULO 1-4) 3. Complete: Discussion Board #3 (ULO 1-4)
	Unit 4: Rotational Kinematics	ULO 1: Describe rotational kinematics equations (SLO 1) ULO 2: Describe rolling motion (SLO 1)	1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 3: Kinematics in Two-Dimensions b. Chapter 5: Dynamics of Uniform Circular Motion 2. Complete: Assignment #4 (ULO 1-3) 3. Complete: Discussion Board #4 (ULO 1-3) 4. Complete: Test #1 (Unit 1-4)
	Unit 5: Force and Newton's Laws of Motion	ULO 1: Explain concepts of inertia and mass (SLO 2) ULO 2: Explain concepts of force and net unbalanced force (SLO 2) ULO 3: Explain Newton's first law of motion (SLO 2)	1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 4: Forces and Newton's Laws of Motion 2. Complete: Assignment #5 (ULO 1-4) 3. Complete: Discussion Board #5 (ULO 1-4)
	Unit 6: Concept of Force and Motion (continued)	ULO 1: Explain concept of force and motion (SLO 2) ULO 2: Explain Newton's second law and third law (SLO 2) ULO 3: Explain Newton's laws to solve problems (SLO 2) ULO 4: Explain concept of static equilibrium (SLO 2)	1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 4: Forces and Newton's Laws of Motion 2. Complete: Assignment #6 (ULO 1-4) 3. Complete: Discussion Board #6 (ULO 1-4)
	Unit 7: Dynamics of Uniform Circular	ULO 1: Explain the concept of rotational Inertia (SLO 2)	1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014).

	Motion and Rotational Dynamics	<p>ULO 2: Explain the concept of Torque (SLO 2)</p> <p>ULO 3: Evaluate problems on Newton's laws in rotational motion (SLO 2)</p> <p>ULO 4: Describe uniform circular motion (SLO 2)</p>	<p>Physics, volume two: Chapters 18-32. John Wiley & Sons.</p> <p>a. Chapter 5: Dynamics of Uniform Circular Motion</p> <p>b. Chapter 9: Rotational Dynamics</p> <p>2. Complete: Assignment #7 (ULO 1-5)</p> <p>3. Complete: Discussion Board #7 (ULO 1-5)</p>
	Unit 8: Work and Energy	<p>ULO 1: Explain work by a constant force (SLO 4)</p> <p>ULO 2: Explain concept of energy and forms of energy: kinetic and potential (SLO 4)</p> <p>ULO 3: Evaluate work energy theorem (SLO 4)</p> <p>ULO 4: Explain work by a constant force (SLO 4)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons.</p> <p>a. Chapter 6: Work and Energy</p> <p>2. Complete: Assignment #8 (ULO 1-3)</p> <p>3. Complete: Discussion Board #8 (ULO 1-3)</p> <p>4. Complete: Test #2 (Unit 5-8)</p>
	Unit 9: Conservation of Energy, Rotational Energy, and Power	<p>ULO 1: Describe conservation of mechanical energy (SLO 4)</p> <p>ULO 2: Evaluate problems in conservation of energy (SLO 4)</p> <p>ULO 3: Evaluate work by a variable force (SLO 4)</p> <p>ULO 4: Evaluate rotational energy (rotational kinetic energy) (SLO 4)</p> <p>ULO 5: Explain the relation between work and power (SLO 4)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons.</p> <p>a. Chapter 6: Work and Energy</p> <p>b. Chapter 9: Rotational Dynamics</p> <p>2. Complete: Assignment #9 (ULO 1-5)</p> <p>3. Complete: Discussion Board #9 (ULO 1-5)</p>
	Unit 10: Impulse, Linear, and Angular Momentum	<p>ULO 1: Define and explain impulse and momentum (SLO 2)</p> <p>ULO 2: Describe types of collision: elastic and inelastic (SLO 2)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons.</p> <p>a. Chapter 7: Impulse and Momentum: Section 7.1 to 7.6</p> <p>b. Chapter 9: Rotational</p>

		<p>ULO 3: Describe conservation of momentum (SLO 2)</p> <p>ULO 4: Explain angular momentum (SLO 2)</p> <p>ULO 5: Evaluate problems on conservation of angular momentum (SLO 2)</p>	<p>Dynamics: Section 9.6</p> <p>2. Complete: Assignment #10 (ULO 1-5)</p> <p>3. Complete: Discussion Board #10 (ULO 1-5)</p>
	Unit 11: Simple Harmonic Motion and Elasticity.	<p>ULO 1: Explain simple harmonic motion (SLO 5)</p> <p>ULO 2: Explain the concepts of frequency and period (SLO 5)</p> <p>ULO 3: Describe elastic potential energy (SLO 5)</p> <p>ULO 4: Describe damped motions (SLO 5)</p> <p>ULO 5: Explain the relation to circular motion (SLO 5)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 10: Simple Harmonic Motion and Elasticity</p> <p>2. Complete: Assignment #11 (ULO 1-5)</p> <p>3. Complete: Discussion Board #11 (ULO 1-5)</p> <p>4. Complete: Test #3 (Unit 9-11)</p>
	Unit 12: Waves and Sound	<p>ULO 1: Explain the concept of waves (SLO 5)</p> <p>ULO 2: Describe transverse and longitudinal waves (SLO 5)</p> <p>ULO 3: Describe wave concepts: amplitude and frequency (SLO 5)</p> <p>ULO 4: Explain sound waves and sound intensity (SLO 5)</p> <p>ULO 5: Explain Doppler effect and applications (SLO 5)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 16: Waves and Sound</p> <p>2. Complete: Assignment #12 (ULO 1-5)</p> <p>3. Complete: Discussion Board #12 (ULO 1-5)</p>
	Unit 13: Fluids	<p>ULO 1: Define and Describe pressure and density (SLO 3)</p> <p>ULO 2: Explain hydrostatics and</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 11: Fluids</p> <p>2. Complete: Assignment #13</p>

		<p>Archimedes principle (SLO 3)</p> <p>ULO 3: Explain Pascale's principle (SLO 3)</p> <p>ULO 4: Describe fluid dynamics and equation of continuity (SLO 3)</p> <p>ULO 5: Describe fluid dynamics-Bernoulli's equation (SLO 3)</p>	<p>(ULO 1-5)</p> <p>3. Complete: Discussion Board #13 (ULO 1-5)</p>
	Unit 14: Temperature, Expansion and Calorimetry	<p>ULO 1: Describe temperature, and measurement scales (SLO 6)</p> <p>ULO 2: Explain the constant volume gas thermometer and the kelvin scale (SLO 6)</p> <p>ULO 3: Describe specific heat capacity (SLO 6)</p> <p>ULO 4: Explain Calorimetry (SLO 6)</p> <p>ULO 5: Describe fusion, vaporization, and latent heat of fusion (SLO 6)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 12: Temperature and Heat</p> <p>2. Complete: Assignment #14 (ULO 1-5)</p> <p>3. Complete: Discussion Board #14 (ULO 1-5)</p>
	Unit 15: Thermodynamics	<p>ULO 1: Describe Ideal gas laws (SLO 6)</p> <p>ULO 2: Explain heat, work, and internal energy of a gas (SLO 6)</p> <p>ULO 3: Describe the laws of thermodynamics: 0th Law and First law (SLO 6)</p> <p>ULO 4: Describe and evaluate Thermodynamic processes: isobaric, isochoric, isothermal, and adiabatic (SLO 6)</p>	<p>1. Read Textbook: Cutnell, J. D., & Johnson, K. W. (2014). Physics, volume two: Chapters 18-32. John Wiley & Sons. a. Chapter 15: Thermodynamics</p> <p>2. Complete: Assignment #15 (ULO 1-4)</p> <p>3. Complete: Discussion Board #15 (ULO 1-4)</p> <p>4. Complete: Final Exam</p>

		ULO 5: Describe Ideal gas laws (SLO 6)	
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** These descriptions and timelines are subject to change at the discretion of the instructor.*