PHYS 2426 – Advanced Physics II

Course Syllabus: Fall 2020

"Northeast Texas Community College exists to provide personal, dynamic learning experiences empowering students to succeed."

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	Monday	Tuesday	Wednesday	Thursday	Friday	Online
Office Hours	N/A	8 – 9:20 11 – 12:20	N/A	8 – 9:20 11 – 12:20 1:30 – 4:20	N/A	N/A

This syllabus serves as the documentation for all course policies and requirements, assignments, and instructor/student responsibilities.

Information relative to the delivery of the content contained in this syllabus is subject to change. Should that happen, the student will be notified.

Course Description: This is a calculus-based physics course intended for students majoring in computer science, engineering, mathematics, physics, or related fields of study. Topics include charge, electric fields, magnetic fields, electric potential, current, capacitance, resistance, electromotive force, simple DC and AC circuits, induction, electromagnetic waves, propagation of light and geometric optics. Four hours of college credit.

Prerequisite(s): PHYS 2425 and MATH 2414 (completed or concurrent)

Student Learning Outcomes:

2426.1 Articulate the fundamental concepts of electricity and electromagnetism, including electrostatic potential energy, electrostatic potential, potential difference, magnetic field, induction, and Maxwell's Laws.

2426.2 State the general nature of electrical forces and electrical charges, and their relationship to electrical current.

2426.3 Solve problems involving the inter-relationship of electrical charges, electrical forces, and electrical fields.

2426.4 Apply Kirchhoff's Laws to analysis of circuits with potential sources, capacitance, and resistance, including parallel and series capacitance and resistance.

2426.5 Calculate the force on a charged particle between the plates of a parallel-plate capacitor.

2426.6 Apply Ohm's Law to the solution of problems.

2426.7 Describe the effects of static charge on nearby materials in terms of Coulomb's Law.

2426.8 Use Faraday's and Lenz's Laws to find the electromotive forces.

2426.9 Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.

2426.10 Articulate the principles of reflection, refraction, diffraction, interference, and superposition of waves.

2426.11 Solve real-world problems involving optics, lenses, and mirrors.

2426.L1 Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.

2426.L2 Conduct basic laboratory experiments involving electricity and magnetism.

2426L3. Relate physical observations and measurements involving electricity and magnetism to theoretical principles.

2426L4. Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.

2426L5. Design fundamental experiments involving principles of electricity and magnetism.

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: 20%
Pre-Lab: 10%
Lab Conduct: 10%
Post Lab: 10%
Chapter Exams: 35%
Final Exam: 15%

Total: 100%

Tests/Exams:

TEST 1 (Electrostatics) : Chapters 22-25	9/24
TEST 2 (DC Circuits) : Chapters 26-27	10/8
TEST 3 (Magnets and Electromagnetism): Chapters 28-30	10/29
TEST 4 (Waves) : Chapters 15, 16, 33	11/12
FINAL EXAM Chapters 21-29, 15, 16, 33-36 Final will be comprehensive, plus Light	12/15 @ 8:00 am & 12/17 @ 8:00 am

Lab Policies

1. All students are expected to report to lab on time, prepared to begin.
2. You will have one practical exam in lab that will require a full lab write-up.
3. Labs not requiring a report will still require proof of completion, typically a sheet showing recorded data from the lab activities.
4. Students are expected to remain in the lab classroom for the full lab time. You are encouraged to experiment on your own. However, given the sensitive nature of most of the equipment, you are required to ask the instructor for permission before trying anything off the books.

Other Course Policies:

Online homework will be assigned at the beginning of the first lecture covering relevant topics. It is up to the student to keep up with the homework as the lecture progresses.

Required Instructional Materials: *Physics for Scientists and Engineers, 10th Ed.*

Publisher: Cengage **ISBN Number:** 978-1-337-55327-8

Optional Instructional Materials: *The Cartoon Guide to Physics,* by Larry Gonick and Art Huffman

Minimum Technology Requirements: Scientific Calculator/Graphing Calculator

Required Computer Literacy Skills: You must have access to a word processor for the lab practical.

Course Structure and Overview: This course will rely on a 'flipped' format, meaning the student is expected to read through the relevant chapter before lecture. Class will focus on solving relevant problems using mathematical and conceptual methods. Given the current COVID conditions, the lecture will be recorded via Zoom with a link available on Blackboard for those in self-quarantine. Everyone, including Zoom participants, will be expected to participate in discussions and classwork.

Communications: Emails will be responded to within 24 hours if sent Monday-Thursday. I do not have reliable Internet over the weekends, so weekend responses are likely to take longer.

Institutional/Course Policy: Students are expected to be on time to every class, whether attending face-to-face or via Zoom. Cell phones are expected to be kept on silent so that class is not interrupted. Those preoccupied with a cell phone conversation (via text or voice) will be asked to leave class. No late assignments will be accepted without prior authorization from the instructor.

Alternate Operations During Campus Closure and/or Alternate Course Delivery Requirements
In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Northeast Texas Community College to move to altered operations. During this time, Northeast Texas Community College may opt to continue delivery of instruction through methods that include, but are not limited to, online through the Blackboard Learning Management System, online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor NTCC's website (http://www.ntcc.edu/) for instructions about continuing courses remotely, Blackboard for each class for course-specific communication, and NTCC email for important general information.

Additionally, there may be instances where a course may not be able to be continued in the same delivery format as it originates (face-to-face, fully online, live remote, or hybrid). Should this be the case, every effort will be made to continue instruction in an alternative delivery format. Students will be informed of any changes of this nature through email messaging and/or the Blackboard course site.

NTCC Academic Honesty/Ethics Statement:
NTCC upholds the highest standards of academic integrity. The college expects all students to engage in their academic pursuits in an honest manner that is beyond reproach using their intellect and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. This course will follow the NTCC Academic Honesty and Academic Ethics policies stated in the Student Handbook. Refer to the student handbook for more information on these subjects.

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 request accommodations. An appointment can be made with the Academic Advisor/Coordinator of Special Populations located in Student Services and can be reached at 903-434-8264. For more information and to obtain a copy of the Request for Accommodations, please refer to the special populations page on the NTCC website.

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.

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

Week	Topic
1	Electric Fields
2	Continuous Charge Distributions and Gauss's Law
3	Electric Potential
4	Capacitance and Dielectrics
5	Current and Resistance
6	DC Circuits
7	Magnetic Fields
8	Sources of Magnetic Field
9	Faraday's Law
10	Mechanical Waves
11	Sound and Hearing
12	The Nature and Propagation of Light
13	Geometric Optics
14	Interference and Diffraction
15	Interference and Diffraction
16	Final Exam