Instructor: Faranak Zarnani, Ph.D.
Email: fzarnani@dccc.edu
Office Hours: By appointment
Division Office: 972-860-4750
Chaz Hafey: 972-860-4766

Lecture: MTWR 9:40 – 11:40 am, K254
Lab: MTWR 11:50 am – 1:50 pm, K251

Catalog Description
The second semester of a calculus-based physics sequence for science, computer science, and engineering majors. Principles of electricity and magnetism, including circuits, electromagnetism, waves, light and optics are studied. Performance of basic laboratory experiments supporting theoretical physics principles and applications of electricity and magnetism, including circuits, electromagnetism, waves, light and optics. The course also includes experimental design, data collection and analysis, and preparation of laboratory reports. (3 Lec., 3 Lab.)
Coordinating Board Approval Number 4001015703

Prerequisite
Physics 2425. MATH 2414 (Calculus II). DREA 0093 or English as a Second Language (ESOL) 0044 or have met the Texas Success Initiative (TSI) standard in Reading.

Student Learning Outcomes
1. State the principles and laws of physics as they apply to electricity, magnetism, waves, and optics.
2. Identify and use relevant equations applicable to electricity, magnetism, waves and optics.
3. Apply the concepts learned to solve theoretical problems and explain phenomena in the laboratory and in the outside world.
4. Perform laboratory experiments that illustrate important concepts and analyze the data gathered using scientific principles.
5. Develop skills for analytical thinking that are useful for problem solving in physics and other fields.
6. Participate in enrichment activities that lead to an appreciation of how physics has developed, how physics affects other fields and the relevance of learning physics.

Learning Outcomes for PHYS 2426 from the Texas Higher Education Coordinating Board (THECB)
1. Articulate the fundamental concepts of electricity and electromagnetism, including electrostatic potential energy, electrostatic potential, potential difference, magnetic field, induction and Maxwell’s Laws.
2. State the general nature of electrical forces and electrical charges, and their relationship to electrical current.
3. Solve problems involving the inter-relationship of electrical charges, electrical forces, and electrical fields.
4. Apply Kirchhoff’s Laws to analysis of circuits with potential sources, capacitance and resistance, including parallel and series capacitance and resistance.
5. Calculate the force on a charged particle between the plates of a parallel plate capacitor.
6. Apply Ohm’s law to the solution of problems.
7. Describe the effects of static charge on nearby materials in terms of Coulomb’s Law.
8. Use Faraday’s and Lenz’s laws to find the electromotive forces.
9. Describe the components of a wave and relate those components to mechanical vibrations, sound and decibel level.
10. Articulate the principles of reflection, refraction, diffraction, interference and superposition of waves.
11. Solve real-world problems involving optics, lenses and mirrors.
12. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.
13. Conduct basic laboratory experiments involving electricity and magnetism.
14. Relate physical observations and measurements involving electricity and magnetism to theoretical principles.
15. Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.
16. Design fundamental experiments involving principles of electricity and magnetism.
17. Identify appropriate sources of information for conducting laboratory experiments involving electricity and magnetism.

Core Objectives
PHYS 2426 is part of the Life and Physical Sciences Component Area 030.
(i) Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method.
(ii) Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.
(iii) The following four Core Objectives are addressed in this course to fulfill this requirement:
   - Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
   - Communication Skills: to include effective development, interpretation and expression of ideas through written and visual communication.
   - Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
   - Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

Textbook


Evaluation
Exams: There will be two exams and a comprehensive final exam during the semester. Each exam will consist of conceptual questions and problems. The exams will be taken in the classroom and are closed book/notes. The instructor will provide an equation sheet for reference during the exams. You may use a regular scientific calculator during the exams. Students must follow the Brookhaven College code of student conduct at all times during the course, and during testing.

Lab experiments & Reports: There will be 9 experiments during the semester. Experiments are done in groups, and each student submits an individual report. The format of reports and make-up policy will be discussed during lab introduction. Lab reports are due at the end of each experiment on the day they are performed. Late reports will not be accepted without permission. **A student must make a passing grade in lab to pass the course.**
Assignments: Homework assignments are online. Registration information and due dates are posted on eCampus. Solving problems with understanding and confidence plays a vital role in Physics. Please plan to spend lots of time on problem solving, as it is vital to your success.

The course grade will be calculated as follows:

- Lab Reports……25%
- Assignments……10%
- Exam 1……………20%
- Exam 2……………20%
- Final Exam………25%

**Total Possible…100%**

Grades will be determined as follows:

- A = 90 – 100
- B = 80 – 89
- C = 70 – 79
- D = 60 – 69
- F = 0 – 59

All class grades will be available through Blackboard/eCampus. Incomplete grades are given only when an unforeseen emergency prevents a student from completing the course work. Division chairs must approve all "I" grades.

**Withdrawal Policies**
The deadline for withdrawing from this course with a W is **July 30, 2019**. If you do not file the appropriate forms by that date, you will receive a performance grade, which may be an “F.”

**Financial Aid Statement**
Students who are receiving any form of financial aid should check with the Financial Aid Office prior to withdrawing from classes. Withdrawals may affect your eligibility to receive further aid and could cause you to be in a position of repayment for the current semester. Students who fail to attend or participate after the drop date are also subject to this policy.

**Other Policies**
1. Students are expected to attend class and lab regularly and complete tests and assignments on time. Please meet with me following an absence so alternate arrangements can be made for lab.
2. Students receiving financial aid must show participation prior to the certification date. Do not drop or stop attending without consulting with the Financial Aid office to prevent adverse consequences.
3. If you are a student with a disability and/or special needs who requires accommodations, please contact the Disability Support Services Office in S-136, 972-860-9673, bhcADAservices@decccd.edu.
4. If you will be absent due to a religious observance, please let your instructor know at the beginning of the semester to make alternate arrangements.
5. Scholastic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism and collusion. As a college student, you are considered a responsible adult. Your enrollment indicates acceptance of the Dallas County Community Colleges Code of Student Conduct published in the college catalog.
6. You will be able to view your grades during the semester on eCampus and your final grade on eConnect after the instructor submits the final grade.
7. Effective Fall 2005, the Dallas County Community Colleges will charge additional tuition to students registering for the same course for a third or subsequent time since Fall 2002.
8. Stop before you drop! If you enrolled in a college level course after Fall 2007, you cannot drop more than 6 courses in your entire undergraduate career unless the drop qualifies as an exemption. Please check with the Advising Office in S-113 for more information.
9. The Family Educational Rights and Privacy Act (FERPA) is a Federal Law that protects students and gives you certain rights. These include the right to inspect and review education records, seek amendment of education records, consent to the disclosure of education records, and file a complaint with the FERPA Office in Washington D.C. Please check the DCCCD website under FERPA for more information.
10. No cell phones and No texting in class, lab or in the testing center. Cell phones may not be used as calculators.
11. Laptop computers may be used during class only to take notes or if you have an ebook version of the textbook.
12. The instructor reserves the right to amend the syllabus as necessary.
13. Concealed Carry: Any person who holds a license to carry may carry a concealed handgun on college district property as permitted by law and college district policy. A license holder who carries a handgun on college district property must keep it concealed and on or about their person at all times. The open carry of a handgun (i.e., completely or partially visible) is prohibited on college district property, including any public driveway, street, sidewalk, walkway, parking lot, parking garage or other parking area. Weapons: The use, possession or display of a weapon in violation of law and college district policy is strictly prohibited. This prohibition applies to firearms, knives, clubs, fireworks of any kind, incendiary devices, razors, chains, throwing stars and any other device designed to expel a projectile or to inflict bodily harm. Violations may result in disciplinary action and/or criminal penalties.

Special Help
Please contact me if you need help during the semester. Physics tutors are available for assistance with problem solving during the open lab/tutoring hours. Timings are posted in lab K-251 and on eCampus.

STEM Resource Center
Tutoring is available for physics, mathematics and engineering in room K-137. Feel free to use the facility as a workstation for studying and working on homework problems.

Lab Schedule:

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<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Experiment</th>
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<tbody>
<tr>
<td>1</td>
<td>July 8</td>
<td>Lab Introduction</td>
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<td>July 10</td>
<td>Exp.1 – Electrical Measurements</td>
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<td>2</td>
<td>July 16</td>
<td>Exp.2 – Electric Field Lines and Equipotentials</td>
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<td>July 17</td>
<td>Exp.3 – Ohm’s Law</td>
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<td>July 22</td>
<td>Exp.4 – Resistors in Series and Parallel</td>
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<td>July 24</td>
<td>Exp.6 – RC Circuits</td>
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<td>4</td>
<td>July 30</td>
<td>Exp.9 – Electromagnetic Induction</td>
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<td>August 1</td>
<td>Exp.15 – Interference, Diffraction and Polarization</td>
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<td>5</td>
<td>August 6</td>
<td>Exp.13 – Geometrical Optics</td>
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<td>August 7</td>
<td>Exp.14 – Focal Length of a Convex Lens</td>
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* Schedule is subject to change. Any changes will be announced in class and posted on eCampus.
Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Lecture Topics and Exams</th>
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<tbody>
<tr>
<td>1</td>
<td>July 8 — 11</td>
<td><em>Course Introduction</em></td>
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<tr>
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<td>Ch 23 – Electric Forces</td>
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<td>Ch 24 – Electric Fields</td>
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<td>Ch 25 – Gauss’s Law</td>
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<td>2</td>
<td>July 15 — 18</td>
<td>Ch 26 – Electric Potential</td>
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<td>Ch 27 – Capacitors and Batteries</td>
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<td>Ch 28 – Current and Resistance</td>
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<td><strong>Exam 1 — Chapters 23 — 27 (Thursday, July 18)</strong></td>
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<td>3</td>
<td>July 22 — 25</td>
<td>Ch 29 – Direct Current (DC) Circuits</td>
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<td>Ch 30 – Magnetic Fields and Forces</td>
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<td>Ch 31 – Gauss’s Law for Magnetism and Ampere’s Law</td>
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<td>Ch 32 – Faraday’s Law of Induction</td>
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<td>4</td>
<td>July 29 — August 1</td>
<td>Ch 33 – Inductors and AC Circuits</td>
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<td>Ch 34 – Maxwell’s Equations and Electromagnetic Waves</td>
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<td><strong>Exam 2 — Chapters 28 — 33 (Wednesday, July 31)</strong></td>
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<td>Ch 35 – Diffraction and Interference</td>
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<td>5</td>
<td>August 5 — 8</td>
<td>Ch 37 – Reflection and Images Formed by Reflection</td>
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<td>Ch 38 – Refraction and Images Formed by Refraction</td>
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<td><strong>Final Exam — Comprehensive: Chapters 23 — 35 &amp; 37 — 38 (Thursday, August 8)</strong></td>
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