Catalog Description: Fundamental principles of physics, using algebra and trigonometry; the principles and applications of Electricity, Magnetism, Wave motion, Optics and Nuclear Physics, including harmonic motion, mechanical waves and sound, physical systems, Behavior of light, and various electric laws with emphasis on problem solving.

Lecture hours = 3, Lab hours = 1

Prerequisites: MATH 2413 Calculus I (4 SCH version)

Semester Credit Hours: 4
Lecture Hours per Week: 8AM to 9:15 AM W
Lab Hours per Week: 9:30 AM to 12:05 PM W
Contact Hours per Semester: 48
State Approval Code: 40.0101.57 03

Core Components and Related College Student Learning Outcomes
This course counts as part of the academic requirements of the Panola College Core Curriculum and an Associate of Arts or Associate of Science degree. Yes No: If no, skip to Instructional Goals.

The items below marked with an X reflect the state-mandated outcomes for this course IF this is a CORE course:

☑ Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information
   CT1: Generate and communicate ideas by combining, changing, or reapplying existing information
   CT2: Gather and assess information relevant to a question
   CT3: Analyze, evaluate, and synthesize information

☐ Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
   CS1: Develop, interpret, and express ideas through written communication
   CS2: Develop, interpret, and express ideas through oral communication
   CS3: Develop, interpret, and express ideas through visual communication
Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

- EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion
- EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion

Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

- TW1: Integrate different viewpoints as a member of a team
- TW2: Work with others to support and accomplish a shared goal

Personal Responsibility – to include the ability to connect choices, actions, and consequences to ethical decision-making

- PR1: Evaluate choices and actions and relate consequences to decision-making

Social Responsibility – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities

- SR1: Demonstrate intercultural competence
- SR2: Identify civic responsibility
- SR3: Engage in regional, national, and global communities

Instructional Goals and Purposes:

The purpose of this course is to instruct calculus based science majors such that after studying all materials and resources presented in the course, the student will be able to solve problems and use critical thinking in topics covered this semester.

Learning Outcomes:

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. Describe the structure of the atom, as well as articulate the differences between many types of nuclear reactions and processes.

**Course Content:**
A general description of lecture/discussion topics included in this course are listed in the Learning Objectives section of this syllabus.

Students in all sections of this course will learn the following content:

<table>
<thead>
<tr>
<th>Wave Mechanics</th>
<th>Nuclear Physics</th>
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<tbody>
<tr>
<td>Electricity</td>
<td>Magnetism</td>
</tr>
<tr>
<td>Optics</td>
<td>Circuitry</td>
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**Methods of Instruction/Course Format/Delivery:**

This course is offered in a classical, face to face manner in a classroom and laboratory format on campus in room HNS 1309, with labs given in room HNS 1309.

**Major Assignments / Assessments:**

The following items will be assigned and assessed during the semester and used to calculate the student’s final grade.

**Assignments:**

1. 4 Tests (Nuclear Physics, Optics and Waves, Electricity and Magnetism, Final Exam)
2. One homework assignment each week
3. Quizzes and in class participation
4. Lab assignments

**Assessment(s):**

1. Nuclear Physics and Atomic Structure
2. Wave Mechanics and Optics
3. Electricity, Magnetism and Circuitry
4. Final Exam

**Course Grade:**

The grading scale for this course is as follows:

- Lecture Portion – 75% (Tests: 50%, Quizzes and Homework: 50%)
- Lab Portion – 25% (Labs 100%)

**Textbook, Materials and Supplies needed:**

**Textbook:** College Physics by Sears and Zemansky, 10th Edition

**Supplies and Materials:** Pencils, paper and calculator.

**Recommended Readings:** None
Other:

• For current texts and materials, use the following link to access bookstore listings: http://www.panolacollegestore.com

• For testing services, use the following link: http://www.panola.edu/elearning/testing.html

• If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to http://www.panola.edu/student-success/disabilitiesupportservices/ for more information.

• Withdrawing from a course is the student’s responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.