PHYS 212 – GENERAL PHYSICS II | 3 CREDITS

SYLLABUS

CATALOG DESCRIPTION

A continuation of PHYS 211 in which electricity, magnetism, light, and modern physics are studied

Prerequisites: Strongly recommended that this course be taken with PHYS-212L. Prerequisite: PHYS 211; minimum grade of C.

Semester Offered: On Demand

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in…

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

Course Learning Outcomes

Upon successful completion of the course, the student will be able to…

1. Electric fields and potentials
2. Simple circuits and non-magnetic circuit elements
3. Magnetic fields and electromagnetic induction
4. Electromagnetic waves
5. Geometrical optics
6. Physical optics
7. Special relativity
8. Particles and waves

Specific Learning Outcomes

Upon successful completion of the course, the student will be able to…

1. List the three fundamental properties of charge.
2. Find the net force acting on a charged particle placed in an electric field.
3. Calculate the magnitude and directions of an electric field at a given point for a static distribution of charged particles.
4. Sketch electric field lines for pairs of like and unlike charges.
5. Distinguish between electric potential energy and electric potential.
6. Calculate potential energy for a group of charges.
7. Identify several uses for a capacitor.
8. List three methods for changing a capacitor's capacitance.
9. Distinguish between polar and non-polar dielectrics.
10. Explain the differences between resistance and resistivity.
11. Apply Ohm's Law to circuits.
12. Calculate the power of a home appliance.
13. Build a simple DC circuit.
14. Use an ammeter and voltmeter to measure current, voltage, and resistance in a simple DC circuit.
15. List at least one method for the production of a magnetic field.
16. Calculate magnitude and direction of the force on a charged particle moving in a magnetic field.
17. Predict the motion of individual charged particles as they move through a magnetic field.
18. Explain the purpose of placing a magnetic circuit element in a simple AC circuit.
19. Calculate the magnetic flux through a surface.
20. Explain how a transformer works on the principles of Faraday's Law and Lenz's law.
21. Describe some basic properties of an electromagnetic wave including energy transport and polarization.
22. Calculate the various parameters related to EM waves such as frequency, wavelength, energy transport, state of polarization etc.
23. Draw ray diagrams for combinations of thin lenses.
24. Use the ray model of light
25. Calculate the image formed from mirrors by using the mirror equation.
26. Understand the index of refraction for different materials and it's wavelength dependence.
27. Perform calculations using Snell's Law.
28. Build a simple refracting telescope.
29. Demonstrate the Law of Refraction
30. Calculate the thickness of a thin film using the principles of interference.
31. Apply the principle of geometrical optics to understand basic optical instruments.
32. Outline the postulates of special relativity.
33. Apply the implications of the postulates to determine the time dilation and length contraction between events occurring in different inertial reference systems.
34. Investigate the effects of motion of particles traveling close to the speed of light with respect to mass and energy.