PHYS 211 – GENERAL PHYSICS I | 3 CREDITS

SYLLABUS

CATALOG DESCRIPTION

Non-calculus treatment of Newtonian mechanics, fluids, and sound. Satisfies requirements for most pre-medical and pre-dental programs and some science programs. It is strongly recommended that this course is taken at the same time as PHYS-211L. [NM Common Course Number PHYS 1114, Area III; Laboratory Science Core].

Prerequisites: MATH-160 or MATH 170. (RDNG-095 OR RDNG-096) and ENGL-099 or appropriate Reading and English Accuplacer scores.

Semester Offered: Fall and Spring

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. Kinematics
2. Newton's Laws of Motion
3. Energy, Momentum, and Impulse.
4. Rotational Dynamics
5. Simple Harmonic Motion
6. Fluids
7. Waves and Sound.

Specific Learning Outcomes

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

1. Identify which physical phenomena in nature are vectors or scalars.
2. Perform vector addition, subtraction, and multiplication.
3. Convert units.
4. Apply kinematic equations of motion for projectiles.
5. Sketch and interpret graphs of position, velocity, and acceleration.
6. Solve problems involving relative velocity.
7. Apply Newton's laws of motion.
8. Distinguish between mass and weight.
9. Identify the forces acting on an object and sketch a free body diagram.
10. Sum the forces on an object by vector addition.
11. Work examples involving the application of static and kinetic friction.
12. Differentiate between inertial and non-inertial frames of reference.
13. Use Newton's inverse square law to find the forces between masses.
14. Explain why astronauts appear weightless in orbit.
15. Calculate the linear or rotational acceleration that results when either a constant net force or torque acts on an object.
16. Solve problems involving application of the concepts of work, energy, power, momentum, and impulse.
17. Distinguish between mechanical energy and chemical energy.
18. Apply conservation of energy and momentum to dynamical systems.
19. Differentiate between conservative and non-conservative forces.
20. Implement graphical techniques to calculate the work done by a variable force.
21. Identify the torque's acting on an object and sketch a free body diagram.
22. Sum torques on an object by vector addition.
23. Use the angular kinematic equations to solve problems where the net torque on an object is not zero.
24. Explain elastic deformation.
25. Define stress, and strain.
26. Experimentally determine the spring constant of a spring.
27. Solve problems involving systems exhibiting simple harmonic motion.
28. Calculate the density of an irregular object using Archimedes' principle.
29. Calculate the pressure at a given depth in a static fluid.
30. Solve problems involving ideal fluids in motion.
31. Relate Bernoulli's to the work energy theorem.
32. Explain how a standing wave differs from a traveling wave.
33. Calculate the wavelength, frequency, and speed of a traveling wave.
34. Discuss the difference between constructive and destructive interference.
35. Give examples of naturally occurring resonant systems.
36. Explain the principles behind sound propagation.
37. Use air column resonance's to calculate the frequency of a tuning fork.
38. Use relative frame motion to explain the Doppler shift of sound.