Jacksonville State University
College of Arts and Sciences
Updated June 27, 2006

PHS 211 PHYSICS FOR SCIENTISTS AND ENGINEERS I

COURSE DESCRIPTION

This course is the first of a two-semester sequence designed to introduce the basic concepts of physics. The course will concentrate on the area of physics called Newtonian mechanics that is used to work with macroscopic (ordinary-sized) objects. Beginning with mechanics and motion, we develop methods for mathematically describing the way objects move and predicting their future movement. The course proceeds to study wave motion with springs, strings, water, sound and light. We will take advantage of the power of calculus to depict movement by weaving its structure into our physical laws and theories. Since the development of both calculus and Newtonian mechanics by Sir Isaac Newton, calculus and physics have been intertwined, and students in this course will see these close connections. Prerequisites: MS 141 or equivalent.

TEXT

Physics for Scientists and Engineers (3^{rd} ed.) by Giancoli

COURSE OBJECTIVES

To learn the concepts of motion, mechanics, energy, matter and sound.
To learn the interrelationships between the concepts.
To learn the fundamental mathematical basis of science.

COURSE OUTLINE

Reading	Topic
Ch. 1	Introduction
Ch. 2.1 – 2.3 Ch. 2.4 – 2.6	Velocity Acceleration
Ch. 2.7, 3.1 – 3.3 Ch. 3.4 – 3.6	Vectors 2-d Kinematics
Ch. 3.7 – 3.8 Ch. 3.9 – 3.10, 4.1 – 4.4 Ch. 4.5 – 4.6	Projectile Motion Newton's Laws
Ch. 4.7 – 4.8 Ch. 4.7 – 4.8 **Exam 1**	 **Ch. 1 – 3**
Ch. 5.1 – 5.2 Ch. 5.2 – 5.5	Applications

Ch. 6.1 – 6.3, 6.6 – 6.7	Gravitation
Ch. 7.1 – 7.2 Ch. 7.3 – 7.4 Ch. 8.1 – 8.2	Work Conservation of Energy
Ch. 8.3 – 8.5 Ch. 8.6 – 8.9 Ch. 9.1 – 9.3	 Linear Momentum
Ch. 9.4 – 9.7 Ch. 9.7 – 9.8 **Exam 2**	Collisions **Ch. 4 – 8**
Ch. 9.8 – 9.9 Ch. 10.1 – 10.4 Ch. 10.5 – 10.8	 Rotational Motion Rotational Dynamics
Ch. 10.9 – 10.11 Ch. 11.1 – 11.5, 11.7 Ch. 12.1 – 12.4	 General Rotation Static Equilibrium
Ch. 14.1 – 14.4 Ch. 14.5, 14.7 – 14.8 **Exam 3**	Oscillations **Ch. 9 – 12**
Ch. 15.1 – 15.3 Ch. 15.4, 15.6 – 15.8 Ch. 15.9, 16.1 – 16.3	Waves Sound
Ch. 16.4, 16.6 – 16.7	Doppler Effect
	Comprehensive Final Exam

Jacksonville State University
College of Arts and Sciences
Updated June 27, 2006

PHS 211L ELEMENTARY LAB TECHNIQUES I

COURSE DESCRIPTION

This laboratory accompanies your physics course. It is designed to give you hands-on experiences with the topics discussed in lecture. In groups, you will conduct experiments and analyze data to gain greater insight into the concepts of physics.

TEXT

Physics Lab I Manual, by Dr. Laura Weinkauf

COURSE OBJECTIVES

To learn the methods of science and scientific inquiry.
To learn the mathematical and statistical basis of the concepts.
To learn real-world applications of the concepts.
To learn and apply laboratory safety procedures.

COURSE OUTLINE

Lab 1: Introductory Matters
Lab 2: Motion Graphs
Lab 3: Vectors
Lab 4: Projectile Motion
Lab 5: Newton's Second Law
Lab 6: Inclined Plane
Lab 7: Energy
Lab 8: Collisions
Lab 9: Centripetal Acceleration
Lab 10: Simple Harmonic Motion
Lab 11: Standing Waves