PHYS - 213 **GENERAL PHYSICS I** **Summer I - 2009**

COURSE SYLLABUS

Instructor: **Dr. Ostrovskii, Igor**

Lecture: **Mo To We Th Fr 10:00-11:50 Lewis Hall, Room 101**

Office: **Room 207 Lewis Hall, Email: iostrov@phy.olemiss.edu**

➢ **Office Hours: Mo Tu Th 2:30 – 3:30 p.m. or by appointment (207 Lewis Hall)**

Text: PHYSICS, 6th edition, by Douglas C. GIANCOLI, Chapters 1 – 15.

PLEASE, READ THE BOOK

❖ **Grading scale and evaluation**:

A's --------------------- 90 – 100%
B's --------------------- 80 – 89%
C's --------------------- 70 – 79%, Etc.

• **Grades will be based on the home works, chapter test, and final examination:**
Home works --------- 20%
Chapter test --------- 40%
Final exam --------- 40%

➢ **Course objectives:**

1. Introduce the students to the General Physics.
2. Expand an understanding of the ideas and results of General Physics.
3. Develop an understanding of the current basis of broad knowledge in General Physics: part Mechanics and Thermodynamics.
4. Expand knowledge of physical basis of contemporary numerous applications of General Physics in Medicine, Biology, and Pharmaceutical sciences.
5. Enhance the critical thinking, analytical reasoning, and problem solving skills at the level of General Physics.

➢ **Learning objectives:**
In this course, we introduce the students to General Physics.
In the learning objectives, we answer a question: "What will the students know and be able to do as a result of taking this one-semester class and passing the final examination."

➢ **The learning outcomes for students**:

1. Understand the basic principles of the General Physics *including* Mechanics, Kinematics, Dynamics, Fluids, Waves, and Thermodynamics with their applications.
2. Understand the physical basis of numerous contemporary applications of General Physics in Biology, Medicine, and other Sciences.
3. Learners will build on a critical thinking, analytical reasoning, and problem solving skills.
4. Students will know how to use interactive methods and Internet for their independent learning on "General Physics".

❖ **Test and Final examination schedule:**

Chapter TEST, Chapters 1 through 7 ------------- Friday, June 5, 2009

FINAL EXAMINATION ---------- NOON, Monday, June 22, 2009

➢ **Homework Rules:**
1. Homework is assigned almost every class period and **is due in two classes**.
2. Homework paper should be 8.5 x 11 inches with no torn or tattered edges and should be stapled.
3. Show all your work; **the answer alone is not worth anything**.
4. Homework problems must include **enough English to be understandable.**
5. **Circle the finale answers that you want to be graded.**
6. Homework answers should have units and a reasonable number of significant digits.

➢ **Common Courtesy Guidelines:** For the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regard to all course interactions. **For example:**
• Show up for class on time.
• Do not leave class early, and do not rustle papers in preparation to leave before class is dismissed.
• Be attentive in class; stay awake, do not read newspapers, etc.
• If you must be late or leave early on any particular day, please inform your instructor in advance.
• **Absence** *may jeopardize your standing in class because you are responsible for any in-class activities and for anything presented.*

> **COURSE CONTENTS**

1. INTRODUCTION - **[Ch. 1]**
Physics and its relation to other fields. Measurement, uncertainty, units. SI system.

2. DESCRIBING MOTION: KINEMATICS IN ONE DIMENSION - [Ch. 2]
Reference frames, velocity, acceleration, motion at constant acceleration.

3. KINEMATICS IN TWO DIMENSIONS; VECTORS - [Ch. 3]
Vectors and scalars. Motion in two dimensions (projectile motion).

4. MOTION AND FORCE: DYNAMICS - [Ch. 4]
Newton's first, second and third law of motion. Applications involving friction.

5. CIRCULAR MOTION; GRAVITATION - [Ch. 5]
Kinematics and dynamics of uniform circular motion. Newton's law of universal gravitation. Gravity near the Earth's surface, satellites.

6. WORK AND ENERGY - [Ch. 6]
Work done by constant or varying force. Kinetic energy, potential energy, and total mechanical energy. Conservative and Nonconservative forces, conservation of total mechanical energy, energy transformations.

7. LINEAR MOMENTUM - [Ch. 7]
Momentum, its relation to force, conservation of momentum. Collision and impulse, conservation of energy and momentum in collision. Elastic and inelastic collisions. Center of mass (CM).

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8. ROTATIONAL MOTION - **[**Ch. 8**]**
Angular quantities. Kinematics equations for uniformly accelerated rotational motion. Rolling motion, torque, and rotational dynamics. Rotational kinetic energy, angular momentum and its conservation.

9. BODIES IN EQUILIBRIUM - [Ch. 9]
Forces in equilibrium (statics). Elasticity, stress, strain. Fracture.

10. FLUIDS - [Ch. 10]
Density, specific gravity, pressure in fluids. Pascal's principle, Archimed's principle. Fluids in motion, Bernoulli's equation.

11. VIBRATIONS AND WAVES - [Ch. 11]
Simple harmonic motion, energy in the harmonic oscillator, period of SHM, the simple   pendulum, damped harmonic motion. Forced vibrations, resonance. Wave motion, types of waves. Reflection and   interference of waves, standing waves, resonance.

12. SOUND - [Ch. 12]
Characteristics of sound, intensity (decibels). Sources of sound. Interference of sound waves. Doppler effect. Application of ultrasound in medicine.

13. TEMPERATURE AND KINETIC THEORY - [Ch. 13]
Atomic theory of matter. Temperature and thermometers. Thermal expansion. Thermal stresses. Gas laws and absolute temperature. The ideal gas law. Kinetic theory.

14. HEAT - [Ch. 14]
Heat as energy transfer; distinction between heat, energy, and internal energy. Internal energy of an ideal gas, specific heat, calorimetry. Heat transfer: conduction, convection, radiation.

15. THE LAWS OF THERMODYNAMICS - [Ch. 15]
First law of thermodynamics, applications to some simple systems. Second law of thermodynamics, heat engines. Entropy.

16. REVIEW (Last class # 38).

> **FINAL EXAMINATION ------------------- NOON, Monday, June 22, 2009**

* - The dates/chapters are tentative and may be changed, but **NOT FINAL EXAMINATION.**