PHYSICS - 211 **SUMMER - 2005**

PHYSICS FOR SCIENCE & ENGINEERING

Lecture: MTWThF 8:00 a.m. to 9:50 a.m., Room 109 Lewis Hall
Instructor: Dr. Ostrovskii, Igor
Office: Room 207 Lewis Hall, Tel: 915-1536; Email: iostrov@phy.olemiss.edu

- **Office Hours: MWTh 3:00 – 4:00 p.m. (207 Lewis Hall)**
- **Text**: 1) Fundamentals of Physics, 7-th edition, 2005, by David Halliday, Robert Resnik, Jearl Walker; (Chapters 1 through 19), John Willey & Sons, Inc; ISBN 0-471-21643-7.
- **Grading scale and evaluation**:
  - Grading Scale: A's --- 90 – 100%; B's --- 80 – 89%; C's ---70 – 79%; Etc.
  - Grades will be based on homework, tests, and the final examination:
    Homework ---------- 20%
    Two tests ---------- 40% (#1=20%, #2=20%)
    Final exam ---------- 40%

- **Homework Rules:**

1. Homework is assigned almost every class period and is due at the beginning of the **next** class period.
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. Homework answers should have units and a reasonable number of significant digits.
   - **Circle the finale answers that you want to be graded.**

- **Tests and Final examination schedule:**

  Test 1, PART 1, Chapters 1 through 11 ---------- Monday, June 13
  Test 2, PART 2, Chapters 12 through 18 ---------- Wednesday, June 22
  - Final examination ---------- Monday, June 27, 2005, 8 a.m.

- **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, don't read newspapers, etc.
- If you must be late or leave early on any particular day, please inform your instructor in advance.
- After the first day, you will need to sit in the same seat for each class.
- **Absence** may jeopardize your standing in class because you are responsible for any in-class activities.

- Students who do not practice common courtesy should expect their grade to be reduced because their in-class activity is under the question.

COURSE SYLLABUS

1. *MEASUREMENTS*
   - Motion, position, displacement, velocity, acceleration.
   - Graphical integration in motion analysis.
2. *MOTION ALONG A STRAIGHT LINE*
   - Motion, position, displacement, velocity, acceleration.
   - Graphical integration in motion analysis.
3. *VECTORS* (Vectors, scalars, unit vector, vector algebra.)
4. *MOTION IN TWO AND THREE DIMENSIONS*

- Position and Displacement, Velocity, Acceleration.
- Projectile motion, Circular motion, Relative motion.

5. *FORCE AND MOTION - I*
   - Newtonian Mechanics; Newton's First, Second & Third Laws.
6. *FORCE AND MOTION - II*
   - Friction, Drag force, Terminal speed.
7. KINETIC ENERGY AND WORK
   - Kinetic energy; Work; Work of the Gravitational force, Spring and Variable force.
8. *POTENTIAL ENERGY AND CONSERVATION OF ENERGY*
   - Work and potential energy (PE) , path independence of conservative force.
   - Conservation of mechanical energy, Conservation of Energy.
9. *CENTER OF MASS AND LINEAR MOMENTUM.*
   - Center of mass, Newton's 2nd Law for a system of particles, Linear momentum.
   - Collision and Impulse, Conservation of Linear momentum, Inelastic and Elastic collisions.
10. *ROTATION.*
    - Rotational variables, Angular variables, Kinetic energy of rotation, Torque.
    - Newton's 2nd Law for rotation, Work and Rotational Kinetic energy.
11. *ROLLING, TORQUE AND ANGULAR MOMENTUM.*
    - Rolling, Kinetic energy of rolling, Angular momentum, Newton's 2nd law.
    - Angular momentum of a Rigid body rotating, Conservation of Angular momentum.

- **<u>TEST #1 (class 20), Chapters 1 through 11 → Monday, June 13.</u>**

12. *EQUILIBRIUM AND ELASTICITY.*
    - Equilibrium, Center of gravity, Elasticity.
13. *GRAVITATION.*
    - Newton's law of gravitation, Gravitational field and principle of superposition.
    - Gravitational PE, Gravitation near and inside Earth, Kepler's Laws.
14. *FLUIDS.*
    - Density and Pressure, Pascal's and Archimedes principles, Bernoulli's Equation.
15. *OSCILLATIONS.*
    - Simple harmonic motion, Energy in SHM, Pendulums.
    - Damped SHM, Forced oscillations and Resonance.
16. *WAVES – I.*
    - Types of waves, Wavelength and Frequency, Speed of traveling wave.
    - Energy and Power of traveling wave, Wave Equation, Interference, Standing waves.
17. *WAVES – II.*
    - Sound waves, Speed, Interference, Intensity, Sources, Beats, Doppler Effect.
18. *TEMPERATURE, HEAT, AND FIRST LAW OF THERMODYNAMICS.*
    - Temperature, Zeroth Law, Celsius and Fahrenheit Scales, Thermal expansion, 1st Law.

➢ **<u>TEST #2 (class 34), Chapters 12 through 18 → Wednesday, June 22</u>**

19. *THE KINETIC THEORY OF GASES.*
    - Ideal Gases; Pressure, temperature and RMS Speed; Translational Kinetic Energy.
    - Mean free path; Distribution of molecular speed.
20. *REVIEW.* (Last class # 38)

➢ **<u>FINAL EXAMINATION: → Monday, June 27, 2005, 8 a.m.</u>**

* - The dates and sections are tentative, and may be changed (**but not Final exam!**).