COURSE INFORMATION
Physics 221 - Fall 2005
Classical Physics I

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Text: ***Physics for Scientists and Engineers*** 6th Edition by **R.A. Serway** and **J.W. Jewett**
ISBN: 0534408427 © 2004

Goals of this course: Very generally, we will try to address the following goals:

1. To acquire rather detailed qualitative understanding of *classical mechanics* and its basic notions and concepts such as, for example, velocity and acceleration, mass, inertia, forces, linear and rotational motions, Newton's laws of motion, and mechanical work and energy.
2. To develop mathematical skills, analytical methods and effective problem solving skills. An emphasis on using the powerful machinery of calculus will be made.
3. To enhance both written and oral communication skills appropriate to physics.

A rough schedule appears below. Lectures will cover only selected topics from the text but *you will be responsible for all corresponding text material unless specifically told otherwise*.

MECHANICS (Ch. 1-14)

Ch 1. Physics and Measurement
- Standards of Length, Mass, and Time
- Dimensional Analysis
- Estimates and Order-of-Magnitudes
- Conversion of Units

Ch 2. Motion in One Dimension
- Position, Velocity, Speed, Acceleration
- Motion Diagrams
- Freely Falling Objects

Ch 3. Vectors
- Vectors and Scalars
- Components of Vectors and Unit Vectors

Ch 4. Motion in Two Dimensions
- Projectile Motion
- Circular Motion
- Tangential and Radial Acceleration

Ch 5. The Laws of Motion
- The Concept of Force
- Newton's Laws of Motion and their applications

Ch 6. Circular Motion and Other Applications of Newton's Laws
- Second Newton's Law Applied to Circular Motion
- Motion in the Presence of Resistive Force

Ch 7. Energy and Energy Transfer
- Work Done by Constant and Varying Forces
- Work-Energy Theorem

Ch 8. Potential Energy
- Conservative and Non-Conservative Forces
- Changes in Mechanical Energy

Ch 9. Linear Momentum and Collisions
- Impulse and Momentum
- The Center of Mass
- Rocket Propulsion

Ch 10. Rotation of a Rigid Object
- Angular and Linear Quantities
- Moment of Inertia and Torque
- Rotational Kinetic Energy

Ch 11. Angular Momentum
- The Product and Torque
- Conservation of Angular Momentum

Ch 12. Static Equilibrium
- The Conditions for Equilibrium

Ch 13. Universal Gravitation
- Newton's Law of Universal Gravitation
- Kepler's Laws and Motion of Planets

Ch 14. Fluid Mechanics *(time permitting)*
- Pressure and its Variation with Depth
- Buoyant Forces and Archimedes's Principle

Exam Schedule (Tentative)

October 13th	**First Exam**: Chapters 1-5
November 10th	**Second Exam**: Chapters 6-9
November 28th	**Third and Final Exam**: Chapters 10-14 Monday, 11:00 AM – 1:30 PM (tentative date and time!)

Dates to remember:
October 03: Last day to withdraw without a "W" being recorded.
October 31: Last day to withdraw for a serious and compelling reason.

Laboratories

There will be *no writeups* required for the laboratories but you will be asked questions about the laboratory exercises on the quizzes and exams. The handouts related to the lab exercises help to explain what you need to understand. In addition, I will go over the material repeatedly during the lab exercises. Lab assignments and dates will be announced later.

Quizzes

A quiz will be given once every other week and will consist of a series of short answer/multiple choice questions which will make sure that you keep up with the lecture, lab, and problem sets.

Exams

By far, the most important determinant of your grade is exam performance. The exams are *heavily biased* toward the homework problems but some conceptual questions will be asked, especially pertaining to the lab exercises. So, if you do your homework conscientiously and attend each class and lab session well prepared, you will perform well, gradewise. For each exam, you will be provided with a "cheat sheet" that includes all of the pertinent equations and constants; so, you won't be expected to memorize much.

Homework Problems

Problem solving is the key to mastering physics. In fact, if you master all of the questions and problems at the end of each chapter, you will do very well in the course. On a regular basis, I'll "assign" some representative problems. For example, the first two sets are shown below. Most of these questions will be discussed in detail in problem solving sessions held approximately once a week, usually on Thursday.

Chapter 1	**Questions:** 5, 6, 8. **Problems:** 6, 9, 13, 14, 17, 22, 31, 41, 50, 52, 55.
Chapter 2	**Questions:** 2, 8, 10, 11. **Problems:** 3, 4, 6, 11, 12, 19, 27, 43.

Grade Distribution

Three Exams	75%
Quizzes	25%

Approximate final grade range:

A	91-100%
B	76-90%
C	61-75%
D	51-60%
F	<= 50%

About grade assignments. Ultimately, the final grade I assign to you is my judgment of your performance (and only your performance). Inevitably, this judgment contains some subjective component, regardless of how objective I try to be. At the end of the course I will discuss only the bookkeeping related to a person's grade, but not my assignment of a letter grade. For example, if a student's final score is 79%, I will review at his/her request how I arrived at that number, but I WILL NOT argue with the student why I think that should be a letter grade as opposed to some other letter grade. I will be the judge – NOT THE STUDENT – of what 79% means in the context of the class. Also, any inquiries regarding grades must be made by email.

By staying in the class, the student agrees to the terms in this syllabus.