SYLLABUS: PS150 PHYSICS I FOR ENGINEERS ERAU DAYTONA BEACH
TERM: Fall 2004 MWF 1:00-2:00 LB329
INSTRUCTOR: Dr. Chris Vuille
OFFICE: LB317
PHONE: 226-6724
OFFICE HOURS: MWF 10:20-11:40 TR 9:30-12:30.
E-MAIL: vuille@erau.edu Or cvuille@yahoo.com
COURSE TEXT: Freeman and Young, 11th Edition
COURSE DESCRIPTION: Vector and scalar quantities, kinematics, Newton's laws of motion, work, work-energy, conservation of energy, conservation of momentum, center of mass and its motion, geometrical optics. Corequisite: MA241.

GOALS: This course is the first of a three-semester course sequence for students in the Aerospace Engineering, Electrical Engineering, Aviation, Computer Science/Engineering and Engineering Technology programs. It is a survey course in mechanics and geometrical optics, designed to provide the students with an appropriate background for more advanced coursework in physics and engineering.

CLASS POLICIES AND GRADING: There will be two tests, at least one major quiz, and a final exam counting two tests. Homework will count a total of 10%, with the tests, final exam, and quiz (or quizzes) counting 90%. Makeups will be decided on a case by case basis. Late homework will be accepted only on late homework days. Tests will be announced a week in advance. No notes are allowed, except for a 3 in by 5 in card for the final. Primitive calculators only, please. Homework grade will consist of homework quizzes and the homework folder, the latter collected occasionally. The homework folder must be neat, complete, one side of the paper only, answers boxed, all in the proper order. Most of the homework grade will be earned in quizzes in class on the homework. Homework consists of common problems assigned by all instructors, and Vuille's assignments. Reasonable modifications in this plan will be made whenever the instructor feels it's necessary.

Final Exam: Sat, December 11, 7:15pm – 9::15 pm.

CLASS ASSIGNMENTS: (May be modified as we proceed.)

Chapter 1
Discussion Questions 5, 8, 10, 11, 15, 20
Exercises 12, 13, 18, 24, 31, 33, 35, 43, 46, 48, 52,
Problems 66, 72
Challenge Problems 97
Vuille's Assignment: exercises 1,4,9,16,20,26,31,37,45,51,55,75

Chapter 2
Discussion Questions 1, 4,12,19
Exercises
Problems

Challenge Problems
Vuille's assignment:: 1, 9,12,20,22,40,50,67,82

Chapter 3
Discussion Questions 5, 6,13
Exercises/Problems 9, 12, 19, 29, 33, 37, 39, 41, 92

Chapter 4
Discussion Questions 1, 3, 7, 26,31,41
Exercises/Problems 5,9,17,23,27,37,39

Chapter 5
Discussion Questions 2,5,7,11,19,26
Exercises 1,3,7,15,19,23,35,36,44,49,52
Problems 60,90
Challenge Problems

Chapter 6
Discussion Questions 1, 2, 4, 10, 15, 17, 19, 21
Exercises 1, 4, 10, 27, 31, 37, 47, 51, 55, 57, 61,
Problems 57, 61
Challenge Problems 102

Chapter 7
Discussion Questions 5, 6, 11, 14
Exercises 5, 9, 15, 24, 25, 31, 33, 35
Problems 65, 75
Challenge Problems

Chapter 8
Discussion Questions 2, 3, 6, 9, 13 18 21
Exercises 4, 10, 17, 19, 29, 34, 39, 40, 45, 46, 51-57
Problems 83, 104-109
Challenge Problems 112

Chapter 33
Discussion Questions 5, 6, 19
Exercises 1, 11, 14, 18
Problems 35, 46, 48
Challenge Problems -

Chapter 34
Discussion Questions

Exercises
Problems
Challenge Problems

PERFORMANCE OBJECTIVES:

1. Solve problems involving vectors in rectangular and polar coordinates using vector addition, subtraction, multiplication (dot and cross products), and including finding magnitudes of vectors and angles between vectors.
2. Know the basic and fundamental units in the S.I. system and the English system. Be able to use dimensional analysis and be able to convert units. Be able to perform "order of magnitude" calculations.
3. Restate Newton's Laws of Motion. Solve vector problems using Newton's Laws. In doing this, employ the knowledge of friction (static and kinetic) and uniform circular motion. Derive the expression for centripetal acceleration for uniform circular motion. Draw free-body diagrams.
4. Define work, kinetic energy and potential energy. Compute work for constant and variable forces. Demonstrate the use of work-energy theorem and the conservation of energy. Define the concepts of linear momentum, impulse, center-of-mass (conservation of momentum), and demonstrate understanding by solving problems in one- and two-dimensions.
5. Know the difference between geometrical optics and physical optics. Be able to use and understand the usefulness of the ray diagrams using the three basic rays. Define the index of refraction and realize that it depends on wavelength. Know why waves refract and be able to apply Snell's law to solve problems.
6. Be able to calculate image, object distances and focal lengths for concave and convex mirrors and thin lenses. Be able to use the lensmaker equation in solving problems. Be able to analyze and solve systems with more than one lens, using ray diagrams and equations. Know how to apply this to instruments like the camera and telescope.