SYLLABUS: PS250 PHYSICS III FOR ENGINEERS ERAU DAYTONA BEACH
TERM: FALL 2002 Section 1 MWF 8:00-9:00 SH5 Section 02: MWF 9:15-10:15 SH 5; Section 04: MWF 11:45-12:45 W308
INSTRUCTOR: Dr. Chris Vuille
OFFICE: LB317
PHONE: 226-6724
OFFICE HOURS: MWF 9:00-10:30; 1:00-2:00 TR 9:30-11:15
E-MAIL: vuille@erau.edu Or cvuille@yahoo.com
COURSE TEXT: Young and Freeman, 11th Edition.
COURSE DESCRIPTION: Electric fields and Gauss's law. Electric potential and electrostatic potential energy. Capacitance. Simple DC circuit theory. Magnetic force, magnetic field, and Ampere's law. Faraday's law. Inductance. Electromagnetic oscillations and wave propagation. Selected topics in modern physics.

GOALS: This course is an introductory course in college physics required for students in the Aerospace Engineering, Electrical Engineering, Aviation Computer Science and Aircraft Engineering Technology programs and as an elective for others requiring physics at this level. The fundamental aim of the courses is that of providing a rigorous introduction to classical physics at a realistic level of conceptual and mathematical sophistication for students who are concurrently taking a beginning course in calculus. The emphasis is on developing an understanding of the basic physical principles. Problem solving is central to this aim and practical applications are introduced where appropriate.

CLASS POLICIES AND GRADING: There will be two tests, a major quiz, and a final exam counting two tests. Homework will count a total of 10%, with the tests, final exam, and quiz counting 90%. Makeups will be decided on a case by case basis. The homework grade will consist of quizzes covering the homework, and in addition a general mark given on a homework folder which will be turned in once or twice during the semester. The folder should be neatly organized in a thin binder, one side only, show work, box your answers. Tests will be announced a week in advance. Reasonable modifications in this plan will be made whenever the instructor feels it's necessary.

Final Exam: Saturday, December 11, 2004, 19:15-21:15

CLASS ASSIGNMENTS: (May be modified as we proceed)

CHAPTER	PROBLEMS
21	9,17,30,31,45,53,59,71,87,95
22	1,7, 18, 23,39, 45,55,57
23	1,11,12,17,27,29,33,37,51,79
24	5, 11,15,27, 38, 50,51
25	1,5,9,15,26,33,42,67
26	9,11,19,36,45,57
27	1,17,21,31,35,43,66
28	1, 9,19,25,37,62,67,79

29	7,19,24,27,50,65
30	7,12,21,29
32	1,5,15,19,31,39,49
35	1,21,30,37,45
38-40	Assigned later

PERFORMANCE OBJECTIVES:

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1. Solve problems in static electricity using Coulomb's law and electric fields. Be aware of the similarities between gravitational and electric forces and fields. Calculate electric fields for various charge configurations, including continuous charge. Be able to set up and carry out the appropriate integrations.

2. Analyze and be able to use Gaus's laws for electricity and magnetism, Ampere's law, and Faraday's law.

3. Solve and analyze problems with electric potential and electric potential energy, for discrete and continuous charge.

4. Be able to use capacitors, resistors, and inductors in circuits. Calculate the energy associated with charged capacitors and inductors. Analyze RC, RL, and LC circuits. Understand exponential rise and decay. Make analogies with simple harmonic motion for LC circuits. Be able to calculate the natural frequency for LC circuits.

5. Define conventional current and resistance, and be able to use Ohm's law and Kirchoff's rules for multiloop circuits. Know how to calculate power inputs and losses in circuits.

6. Be able to explain the origin of magnetic effects. Calculate forces on charges moving in magnetic fields. Explain how a cyclotron, solenoid, and torroid work.

7. Recognize that the current wave picture of electromagnetic radiation (including light) comes from Maxwell's equations. Additionally, recognize the problems with Maxwell's equations that produced the search for the ether. Be aware of the breakdown of classical physics at high speeds.

8. Be able to solve simple problems involving single and double slit experiments and diffraction gratings. Understand the principles of constructive and destructive interference. Be able to apply Rayleigh's criterion.

9. Understand the foundations of quantum theory, including black body radiation, the photoelectric effect, the

Compton effect, the uncertainty principle. Be familiar with Schrodinger's equation and its solution for a one-dimensional box, together with the wave function's interpretation as a probability amplitude.