

PHYS 2523 – General Physics for Science and Engineering II

Spring Semester, 2007

Professor	Dr. Cleo L. Bentley, Jr	Office Hours	MW 1-4, T 12:30-2, Th 1-4
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CATALOG DESCRIPTION Credit 4 semester hours. A continuation of calculus-based general physics. Course includes heat and thermodynamics, sound, electricity, magnetism, optics, and select topics from modern physics.

CO-REQUISITE: MATH 2024 and PHYS 2521.

PREREQUISITES BY TOPIC:

Physics lab II and integral calculus.

TEXTBOOK: Douglas C. Giancoli, "Physics for Scientists and Engineers," 4th Edition, Addison Wesley

COURSE GOALS:

The purpose of this course is to give the student a calculus-based exposure to oscillations, sound, heat and thermodynamics, electricity, magnetism, optics, relativity and some modern physics in which he, or she, will be challenged and evaluated for understanding.

Course Outcomes :

Upon completing this course the student will have knowledge of many concepts in general physics with calculus, as well as experience in solving many word problems in math and physics associated with standard concepts.

Course Outcomes:

Upon completing this course the student will have knowledge many concepts in general physics with calculus, an enhanced applied knowledge of differential and integral calculus, trigonometry, algebra, vector operations to include vector addition, dot product, cross product, Cramer's rule for simultaneous equation solutions, experience in solving many word problems in math and physics associated with standard concepts, enhanced understanding of how things work in mechanical, heat, sound, electrical, magnetic, optical and relativistic systems, and the like.

Course Policies:

This course uses the lecture format. Reading and homework assignments will be made, and some problems will be graded. Occasional quizzes (expected everyday) will check the reading assignments. It is expected that you will need to spend at least two hours studying outside the class for each hour spent in class. That means you should plan to devote a minimum of nine hours per week for this class.

Homework And Grading

1)

a. Your grade will be based on class participation in the form of explaining problems and taking quizzes (extra points to buffer your exam scores--you get paid for everything that you do), and four major exams (covering four to five current chapters each).

b. Attendance should be maintained. Particularly, there is no way to make-up a quiz or lab missed, but if you miss a quiz, two points are taken.

c. Remember: 'To hear is to forget, to see is to know, to do is to understand'.

d. Your final grade will be based on your overall average falling in the following categories: A--from 90 to 100; B--from 75 to 89; C--from 60 to 74; D--from 40 to 59; F--under

* Student Academic Appeals Process (undergraduate catalog, 1998-2001,

Pp. 88-91)

100—90	A
89—75	B
74—60	C
59—40	D
40—0	F

- 2) Material in each reading assignment will be covered in the lecture on the date given. You should read the entire assignment and if possible work some of the problems before the class.
- 3) Assignments will be given each day. Problem assignments must be ready to hand in at the beginning of next class, or put on the board for you to explain for extra points up to 3 per problem. A random selection of these problems will be graded. Problem assignments and quizzes that are late or missed will not be made up.

Oral and Written Communications

Oral or Written communication assignments are given through exams, quizzes, board explanations, and lab assistance and reports.

Attendance Policy: (undergraduate catalog, 1998-2001, pp.80)

Classes will start at the prescribed time and will end at the prescribed time. Excessive absences or tardiness will result in lowered grades. Excessive absenteeism, whether EXCUSED or UNEXCUSED, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class. University Undergraduate catalog (1998-2001, pp.80) provide more detail information.

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ADA statement

Weeks	Topic	Note
1-2.5	<p>COURSE CONTENT</p> <p>This course is the second half of a two semester course in general physics designed for students of science and engineering who have had or are taking calculus. The objective of the course is to enhance the students' quantitative and logical mental skills through the study of physics. It is desirable that the physics learning environment be a microcosm of the professional world--that is, the system of evaluation is to reflect the effort, as well as cleverness, that is produced by the student. Each student is "paid" extra points for class participation outside the major exams and laboratories. A list of what this course will cover and the tentative timetable is found below.</p> <p>FIRST 8 WEEKS</p> <p>Chapters 14-16--oscillations, simple and damped harmonic motion, simple and physical pendula, wave equation, transverse and longitudinal waves, sound waves, boundary reflections, standing waves, resonance, interference, sound intensity, Doppler effect. Chapters 17-20 Celsius, Fahrenheit, Kelvin, and Rankin temperature scales, coefficient of linear and volume expansion. Heat measurement, specific heat capacity, calorimetry, phases of matter, heats of fusion and vaporization. Transfer of heat by conduction, convection, and radiation. Ideal gas equation, parametric equation, Boyle's law, Charles' law, Gay-Lusaac's law, relative humidity. Thermodynamics, adiabatic process, isothermal process, isobaric process. Heat engines, Carnot engine, entropy. Kinetic theory. Review. First major exam.</p> <p>Chapter 21-24--History of electricity, induced charges, Coulomb's law, Electric fields, Gauss's law, Electrical potential, Capacitors in series and parallel, energy of a charged capacitor, effect of dielectric, polarization and displacement vectors. Chapter 25-26--Battery, current, Ohm's Law, resistivity, resistance, electrical work and power. Chapter 28--electromotive force, voltage, physiological effects of currents, resistors in series and parallel, Kirchhoff's rules, ammeter, voltmeter, ohmmeter, Wheatstone bridge, R-C circuit. Chapters 27-30--Magnetism, right-hand rule, equations. Mutual and self inductance, R-L circuit, R-L-C circuit, magnetic permeability, magnetization, magnetic intensity, magnetic susceptibility, ferromagnetism, hysteresis loop, reluctance. Review. 2nd Major Exam</p>	

2.5-5	<p>SECOND 8 WEEKS</p> <p>Chapters 31-36 Alternating currents, capacitive reactance, R-L-C series circuit, impedance, R-L-C parallel circuit, root-mean-square values, resonance, transformer. Poynting vector, Antenna, spectrum of electromagnetic waves, nature and propagation of light, laws of reflection and refraction, index of refraction, Huygen's principle, total internal reflection, geometric optics, lenses and mirrors. The eye, defects of vision, lens prescriptions, interference and diffraction.</p> <p>Chapter 37-38--Special theory of relativity. (Optional) Planck's hypothesis, photoelectric effect, Compton effect, atomic spectra, Bohr theory of hydrogen. Review. 3rd (Final) major exam.</p>	
	Review	Final Exam