


Community College System
University of Hawaii
Maui Community College

COURSE OUTLINE FORM

Course Alpha : PHYS 152
Course Name : College Physics II
Course Description : Discusses electricity, magnetism, optics, and modern physics. Introduces experimental methods in electricity, magnetism, and optics. The second of a two semester course in college physics.
Semester Units : 4
Hours per Week : 3 hours lecture, 3 hours lab
Purposes and Standards : Transfer
Prerequisites : PHYS 151
Date : February 12, 1994
Instructor Signature : 

1. COURSE OBJECTIVES:

To provide students with an introduction to the history, philosophy, and general culture of physics in particular, and to science in general. To teach critical thinking and problem solving skills using applications of physics principles to fundamental phenomena. To emphasize the spirit of experimental science, and to teach skills in gathering and analyzing experimental data.

2. GENERAL EDUCATION AND RELATIONSHIP TO OTHER COURSES:

This is the second of a two-semester course sequence which fulfills the one-year college physics requirement for many majors in the biological and social sciences. It satisfies the laboratory course requirement for the natural science core curriculum for transfer level students.

3. TEXT AND MATERIALS:

Contemporary College Physics (2nd Edition) by Jones and Childers, Laboratory notebook, Physics 152 Laboratory Manual, and calculator.

4. REFERENCE MATERIALS:

There are numerous other textbooks available in the Library and in the instructor's office. There are also several reference and laboratory manuals available from the instructor.

5. AUXILIARY MATERIAL AND CONTENT:

Extensive handouts are provided to the students. Slides, videos, overhead transparencies, and demonstration equipment and apparatus are used to illustrate concepts throughout the course. Extensive use of laboratory equipment is required to complete the laboratory component of the course.

6. METHODS OF INSTRUCTION:

Lectures, discussion, visual aids, and demonstrations are used in this course. Students also participate in laboratory activities and experiments which involves the gathering and analysis of experimental data. Homework assignments are given to practice problem solving skills, and all homework and laboratory assignments are collected, graded, and discussed with students when returned. Quizzes are given on each chapter assigned. The course is divided into four units, and a review session and exam are given on each one. There is a cumulative final exam.

7. COURSE CONTENT:

The course is divided into four units as follows:

Unit 1: Electricity

1. Electric charge
2. Coulomb's Law
3. The electric field
4. Gauss's Law
5. Electric potential and potential difference
6. Capacitance
7. Electric current
8. Ohm's Law and resistance
9. Kirchoff's rules
10. Electric circuits
11. RC circuits
12. Electrical meters
13. Applications

Unit 2: Magnetism

1. The magnetic field
2. Motion of a point charge in a magnetic field
3. Ampere's Law
4. Magnetic flux and Faraday's Law
5. Induced EMF
6. Inductance
7. Generators and motors
8. Alternating current
9. Resonance in AC circuits
10. Transformers
11. Rectifiers

Unit 3: Optics

1. Electromagnetic waves
2. Electromagnetic spectrum
3. Reflection, refraction, and polarization
4. Plane and spherical mirrors
5. Lenses
6. Ray diagrams
7. Optical instruments
8. Wave optics (interference and diffraction)
9. Applications

Unit 4: Modern Physics

1. The Michelson-Morley experiment
2. Special relativity
3. Lorentz transformations
4. Introduction to general relativity
5. Blackbody radiation
6. Photoelectric effect
7. Quantization of atomic energies
8. Introduction to quantum physics
9. The uncertainty principle
10. Nuclear physics
11. Fission and fusion
12. Applications

Laboratory Experiments

Experimental Methodologies and Laboratory Safety
Equipotentials and Electric Fields
Resistivity
Ohm's Law
Electric Circuits I - Series and Parallel
Electric Circuits II - RC Circuits
Magnetic Field of the Earth
The Oscilloscope
Series RLC Circuits/AC Circuit Resonance
Measurement of the Focal Length of Lenses
The Microscope and Astronomical Telescope
Emission Spectra
Lasers and Holography

8. EVALUATION:

Quizzes: 15 quizzes worth 10 points each; highest 10 used
in grade computations

Exams: Four unit-exams worth 100 points each

Labs: 10 graded laboratory reports worth 20 points each

Final: Cumulative, worth 200 points

Grades: A: 90-100% B: 80-89% C: 70-79% D: 55-69%