BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

PHYS 22 - College Physics II **4 Unit(s)**

Prerequisite(s): PHYS 21
Recommended Prep: NONE
Transfer Status: CSU/UC
51 hours Lecture
51 hours Lab

This course is intended for students not majoring in physics or engineering but needing a one-year course in physics as a requirement for their major program. The course is the second part of a two-semester sequence beginning with PHYS 21. Core topics include: electrostatics, magnetism, DC circuits, optics and modern physics. (C-ID PHYS 110). Graded only.

II. **OBJECTIVES**

Upon successful completion of this course, the student will be able to:

A. Analyze simple static charge distributions and calculate the resulting electric field and electric potential.
B. Analyze simple current distributions and calculate the resulting magnetic field.
C. Predict the trajectory of charged particles in uniform electric and magnetic fields.
D. Analyze DC circuits in terms of current, potential difference and power dissipation of each element.
E. Analyze basic situations involving reflection and refraction, and use this analysis to predict the path of a light ray.
F. Analyze situations involving interference and diffraction of light waves, and apply these to situations including double slits, diffractions gratings and wide slits.
G. Understand the limitations of classical physics and begin to develop an awareness of the importance of modern physics (i.e. quantum theory and special relativity) in the natural world.
H. Analyze real-world experimental data, including appropriate use of units and significant figures. (Lab)
I. Relate the results of experimental data to the physical concepts discussed in the lecture portion of the class. (Lab)

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics		Hours
1.	Electrostatics	4.00
2.	Fields	4.00
3.	Potentials	4.00
4.	DC Circuits	3.00
5.	Capacitors	3.00
6.	Resistivity	3.00
7.	Magnetism	3.00
8.	Faraday's and Lenz's Laws	3.00
9.	Ampere's Law	3.00
10.	Geometric Optics	3.00

11.	Lenses, Mirrors and Optical Instruments	3.00
12.	Wave Optics/Physical Optics	3.00
13.	Special Relativity	3.00
14.	Quantum Mechanics	3.00
15.	Atomic Physics	3.00
16.	Nuclear Physics	3.00
Total Hours		51.00

Lab

Topics		Hours
1.	Electrolysis	3.00
2.	Electric Fields	3.00
3.	Charge to Mass Ratio of the Electron	3.00
4.	Capacitors	3.00
5.	Ohm's and Kirchoffs Laws	3.00
6.	Tangent Galvanometer	3.00
7.	Current Balance	3.00
8.	Oscilloscopes and Signal Generators	3.00
9.	AC Circuits	3.00
10.	Lenses and Mirrors	3.00
11.	Optics of the Eye	3.00
12.	Laser Optics	3.00
13.	Optical Instruments	3.00
14.	Photoelectric Effect	3.00
15.	Atomic Spectra	3.00
16.	Radioactivity	3.00
17.	Speed of light	3.00
Total Hours		51.00

IV. **METHODS OF INSTRUCTION**

A. Lecture
B. Instructor Demonstrations
C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
D. Problem-Solving Sessions
E. Reading Assignments
F. Multimedia Presentations
G. Laboratory Experiments

V. **METHODS OF EVALUATION**

A. Exams/Tests
B. Homework
C. Lab Projects
D. Final Examination
E. The 1500 word writing requirement will be satisfied by the writing of 15 formal laboratory

reports.

VI. EXAMPLES OF ASSIGNMENTS

A. Reading Assignments
1. Read the chapter on Faraday's Law and be prepared to discuss the principle of a hydroelectric dam.
2. Read through the example problem in the text regarding computing the electrostatic potential energy of a 4 charge system. Be prepared to take a quiz on a similar problem.

B. Writing Assignments
1. Write a 3 page laboratory report about the earth's magnetic field activity including an introduction, an overview of the procedure, discussion of error analysis and overall conclusions.
2. Produce an example worked problem involving magnetic induction similar in style to those provided in the text but in your own words.

C. Out-of-Class Assignments
1. Research the power output characteristics of the 3 nearest power plants. Use your monthly PG&E usage statistics to determine how many houses like yours these 3 power plants can supply.
2. Find and take pictures of effective diffraction gratings you find outside of an academic environment. Be prepared to share with the class.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. Young, H.D.. College Physics. 9th Edition. Addison Wesley, 2011.
B. Young, H., Adams, P., Chastain, R. College Physics. 10th Edition. Sears and Zemansky, 2016.

Materials Other Than Textbooks:

A. Eggert S. and Trento J., Physics 22 Lab manual , purchased at the bookstore
B. Online Homework
C. Scientific calculator (or equivalent)

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