

Course Outline

COURSE: PHYS 4B **DIVISION:** 10 **ALSO LISTED AS:**

TERM EFFECTIVE: Fall 2018 **CURRICULUM APPROVAL DATE:** 11/27/2017

SHORT TITLE: PHYS FOR SCI & ENG II

LONG TITLE: Physics for Scientists and Engineers - Electricity and Magnetism

Units	Number of Weeks		Contact Hours/Week		Total Contact Hours
4	18	Lecture:	3	Lecture:	54
		Lab:	3	Lab:	54
		Other:	0	Other:	0
		Total:	6	Total:	108

COURSE DESCRIPTION:

An introduction to the principles of physics using calculus. Topics include charge, electric fields, Gauss' Law, electric potential, capacitance, current and resistance, circuit analysis, magnetic fields, Ampere's Law, Faraday's Law, and electromagnetic waves. (C-ID: PHYS 210) (C-ID: PHYS 200S: Phys 4A + Phys 4B + Phys 4C) **PREREQUISITE:** Completion of MATH 1B with a grade of 'C' or better, AND completion of PHYS 4A with a grade of 'C' or better. **COREQUISITE:** MATH 1C.

PREREQUISITES:

- Completion of PHYS 4A, as UG, with a grade of C or better.
- AND Completion of MATH 1B, as UG, with a grade of C or better.
- AND Completion of MATH 1C, as UG, with a grade of C or better., Concurrent OK

COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

- L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

- 02 - Lecture and/or discussion
- 03 - Lecture/Laboratory
- 04 - Laboratory/Studio/Activity
- 047 - Laboratory - LEH 0.7

STUDENT LEARNING OUTCOMES:

1. Identify, describe, compare and contrast the various units of numbers and their significance.

Measure of assessment: Exam, Lab

2. Identify, describe, compare and contrast charge, conservation of charge, insulators, conductors, and Coulomb's Law.

Measure of assessment: Exam, Lab

Year assessed, or planned year of assessment: 2018

Semester: Fall

3. Identify, describe, compare and contrast electric field, Gauss' Law, electric potential, and conservation of energy for charged particles.

Measure of assessment: Exam, Lab

Year assessed, or planned year of assessment: 2018

Semester: Fall

4. Identify, describe, compare and contrast capacitance, resistance, and current.

Measure of assessment: Exam, Lab

Year assessed, or planned year of assessment: 2018

5. Identify, describe, compare and contrast capacitors and resistors in parallel, series, and mixed circuit configurations.

Measure of assessment: Exam, Lab

6. Identify, describe, compare and contrast Ohm's Law, conservation of charge, conservation of energy, and Kirchoff's Rules.

Measure of assessment: Exam, Lab

Year assessed, or planned year of assessment: 2018

7. Identify, describe, compare and contrast magnetic fields, forces on moving charges and currents, and forces between currents.

Measure of assessment: Exam, Lab

Year assessed, or planned year of assessment: 2018

8. Identify, describe, compare and contrast the Biot-Savart Law, Ampere's Law, and Faraday's Law.

Measure of assessment: Exam, Lab

9. Identify, describe, compare and contrast Inductance, LR, LC, and RLC circuits.

Measure of assessment: Exam, Lab

10. Identify and describe electromagnetic waves.

Measure of assessment: Exam, Lab

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Curriculum Approval Date: 11/27/2017

Lecture/Lab Content:

1 Lec

CONTENT

Introduction, numbers and units.

OUT-OF-CLASS ASSIGNMENTS

Reading and homework problems from text.

STUDENT PERFORMANCE OBJECTIVES

Identify and discuss the significance of units of various quantities, convert between systems of units.

HOURS

6 Lec/6 Lab

CONTENT

Electric charge.

OUT-OF-CLASS ASSIGNMENTS

Reading and homework from text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast charge, conservation of charge, insulators, conductors, and Coulomb's Law. Identify, set up, and solve Coulomb's Law problems.

LAB: Electrostatics.

HOURS

6 Lec/6 lab

CONTENT

Electric fields and electric potential.

OUT-OF-CLASS ASSIGNMENTS

Problems and reading from the text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast electric fields and electric potential. Set up and solve Gauss' Law and conservation of energy problems.

LAB: Electric field.

HOURS

6 Lec/6 Lab

CONTENT

Capacitance, resistance, and current.

OUT-OF-CLASS ASSIGNMENTS

Problems and reading from text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast capacitance, resistance, and current. Set up and solve circuit element problems.

LAB: Capacitors.

HOURS

12 Lec/12 Lab

CONTENT

Circuit analysis.

OUT-OF-CLASS ASSIGNMENTS

Reading and problems for text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast circuits containing resistors and capacitors. Set up and solve problems using Ohm's Law and Kirchoff's Rules.

LAB: Circuits with resistors and/or capacitors.

HOURS

6 Lec/9 Lab

CONTENT

Magnetism.

OUT-OF-CLASS ASSIGNMENTS

Reading and problems from text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast magnetic fields, forces on moving charges and currents. Sep up and solve problems on magnetic forces.

LAB: DC motor design and construction.

HOURS

6 Lec/3 Lab

CONTENT

Magnetic induction.

OUT-OF-CLASS ASSIGNMENTS

Problems and reading from text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast the Biot-Savart Law, Ampere's Law, and Faraday's Law. Set up and solve problems finding magnetic fields and induced currents and voltages.

LAB: Determine e/m .

HOURS

6 Lec/6 Lab

CONTENT

Inductive circuits.

OUT-OF-CLASS ASSIGNMENTS

Reading and problems from text.

STUDENT PERFORMANCE OBJECTIVES

Identify, describe, compare and contrast LR, LC, and RLC circuits. Set up and solve problems with LR, LC, and LRC circuits.

LAB: LR, LC, and RLC circuits.

HOURS

3 Lec/3 Lab

CONTENT

Electromagnetic waves.

OUT-OF-CLASS ASSIGNMENTS

Problems and reading from the text.

STUDENT PERFORMANCE OBJECTIVES

Discuss and describe electromagnetic waves. Identify, set-up, and solve problems with electromagnetic waves.

LAB: Electromagnetic waves.

HOURS

2

Final Exam

Lab Content:

METHODS OF INSTRUCTION:

Lecture/discussion. Laboratory exercises. Group projects.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 54

Assignment Description: Regularly assigned homework that requires students to analyze and study pertinent text material, solved examples and lecture notes.

Required Outside Hours: 54

Assignment Description: Regularly assigned homework that requires students to apply the principles and skills covered in class by solving related problems.

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 20.00 %

Lab Reports.

Problem-solving assignments

Percent of total grade: 20.00 %

Homework, quizzes, projects.
Objective examinations
Percent of total grade: 60.00 %

REPRESENTATIVE TEXTBOOKS:

Required Representative Textbooks
Halliday, Resnick, Walker. Fundamentals of Physics. Wiley,2013.
ISBN: ISBN-10: 1118230728
Reading Level of Text, Grade: 12 Verified by: Jennifer Nari

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:
 GAV B1, effective 201270
 GAV B3, effective 201270
CSU GE:
 CSU B1, effective 201270
 CSU B3, effective 201270
IGETC:
 IGETC 5A, effective 201270
 IGETC 5C, effective 201270
CSU TRANSFER:
 Transferable CSU, effective 201270
UC TRANSFER:
 Transferable UC, effective 201270

SUPPLEMENTAL DATA:

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN: XXXXXX
CAN Sequence: PHYS SEQ B
CSU Crosswalk Course Department: PHYS
CSU Crosswalk Course Number: 4B
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000213812
Sports/Physical Education Course: N
Taxonomy of Program: 190200

