# Calculus-Based Physics for Scientists and Engineers: B

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| **C-ID Number** | PHYS 210 |
| **Discipline** | Physics |
| **Date Approved** | April 29, 2011 |

## General Course Description

This course, intended for students majoring in physical sciences and engineering, is part of a three-semester course whose contents may be offered in other sequences or combinations. Core topics include electrostatics, magnetism, DC and AC circuits, and Maxwell’s equations.

## Minimum Units

4.0

## Any rationale or comments

This is the second semester of a three-semester physics course, intended for students majoring in physical sciences and engineering. PHYS 210 is composed of topics that together with PHYS 205 and PHYS 215 constitute all of the topics included in PHYS 200.  Topics may be offered in varying sequences and combinations, including “floating topics”.  The floating topics may be placed in different courses in the sequence, but all must be covered during the three-semester sequence. Since different colleges vary slightly in the order in which the topics are presented, it is strongly recommended that students take the entire sequence at the same institution.

## Advisories/Recommendations

Completion of second semester calculus and concurrent enrollment in third semester calculus.

## Course Content

Electrostatics Fields Potentials Gauss’s Law DC circuits Capacitors Resistivity Magnetism AC Circuits Faraday’s and Lenz’s Laws Ampere’s Law Maxwell’s Equations “Floating Topics” which may be included in this semester Fluids Mechanical Waves Special Relativity Laws of Thermodynamics Heat Engines Kinetic Theory Entropy Properties of EM Waves Geometric Optics Physical Optics Simple Harmonic Motion

## Laboratory Activities

Laboratory activities should cover the range of topics designated for lecture. The majority of labs should be hands-on activities with “real-world” data collection as opposed to computer simulation, although simulations may be appropriate for some topics in modern physics.

## Course Objectives

Lecture Course Objectives:  At the conclusion of the lecture component of this course, the student should be able to:  Analyze simple static charge distributions and calculate the resulting electric field and electric potential. Analyze simple current distributions and calculate the resulting magnetic field. Predict the trajectory of charged particles in uniform electric and magnetic fields. Analyze DC and AC circuits in terms of current, potential difference, and power dissipation for each element.  Laboratory Course Objectives:  At the conclusion of the laboratory component of this course, the student should be able to: Analyze real-world experimental data, including appropriate use of units and significant figures. Relate the results of experimental data to the physical concepts discussed in the lecture portion of the class.

## Prerequisites

C-ID PHYS 205(prerequisite).

## Corequisites

2 Semesters college-level calculus (corequisite) (C-ID MATH 210 and 220 OR MATH 211 and 221 OR MATH 900s)

## Methods of Evaluation

Examinations which include problem solving exercises, final examinations, projects, homework problems, laboratory reports. \*Note that not all of the methods listed are required.

## Sample Textbooks

Typical Textbooks: Giancoli, Douglas C. Physics for Scientists and Engineers Halliday, David; Resnick, Robert; Walker, Jearl. Fundamentals of Physics Knight, Randall D. Physics for Scientists and Engineers: A Strategic Approach Serway, Raymond A.; Jewett, John W. Physics for Scientists and Engineers Typical Lab Manuals: Edmonds, Jr., Dean S. Cioffari's Experiments in College Physics Laws, Priscilla. Workshop Physics Activity Guide, Modules 3 and 4 Loyd, David. Physics Lab Manual Sokoloff, David, Real Time Physics: Active Learning Laboratories, Modules 2 and 3 Laboratory manuals developed on site

## Notes