1. Department, Course Number, and Course Title:

DEPARTMENT OF PHYSICS AND ASTRONOMY

PHYSICS 203 GENERAL PHYSICS (4)

2. Designation:

Required	☑	Elective	☐
Lower Division	☑	Upper Division	☐

3. Course Description: Elementary field theory, basic electricity and magnetism, DC and AC circuits.

4. Prerequisites: PHYS 202; MATH 208 (prerequisite or corequisite)

5. Text and Materials: Physics for Scientist and Engineers, 6th Ed. Serway R., Thomson, 2004
Phys 100/200 Supplement & Notes, Carr
Phys 203 Lab Manual

6. Course Objectives: Students will learn the fundamentals of electrostatics and magnetostatics. Basic direct current circuit analysis with resistive and capacitive elements will be studied

Course Outcomes

- Students will learn about Coulomb's law, Electric fields, electric flux and applications of Gauss' law.
- Students will learn about the concept of the electric potential, capacitance, and dielectrics.
- Students will learn about Ohm's law, electric currents, microscopic semi-classical models of electrical conduction, and the use of Kirchoff's rules to solve direct current circuits.
- Students will be introduced to the effect of magnetic fields on charged particles in motion, the Lorentz force. They will learn that the cumulative effect of the Lorentz force on individual charge carriers results in macroscopic forces and torques on current carrying wires.
- Students will learn how to apply the Biot-Savart law to calculate the magnetic fields generated by current distributions. Ampere's law will be used to demonstrate how symmetries in the current distribution can be used to simplify magnetic field calculations. They will learn how to include the presence of materials in the computation of magnetic fields.

7. Topics Covered: (in Order of Presentation)

- Electric fields (Ch. 23)
- Gauss' law (Ch. 24)
- Electric potential (Ch. 25)
- Capacitance and dielectrics (Ch. 26)
- Current and resistance (Ch. 27)
- Direct current circuits, Kirchoff's rules (Ch. 28)
- Magnetic fields, Lorentz force (Ch. 29)
- Biot-Savart law, Ampere's law, magnetism in matter (Ch. 30)

8. Class Schedule:

Number of Sessions per week:	2 lectures; 1 recitation; 1 laborator	
Duration of each session:	Lecture	1 hr, 15 min
	Recitation	50 minutes
	Laboratory	2 hours, 30 min

9. Contribution of course to meeting the professional component:

This course is part of the one year (48 quarter units) of Basic Mathematics and Science.

Science	4 units

10. Relationship of course to program objectives:

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)

- knowledge of current events and societal contemporary issues -- non-engineering related. (abet j)
- knowledge of measurement techniques

Skill outcomes:

- an ability to design and conduct experiments as well as to analyze and interpret data (abet b)
- an ability to communicate effectively (abet g)
- an ability to think in a logical sequential process

Attitudes Outcome:

- a desire to be a flexible and adaptable team player (collaborative attitude)

11. Prepared by:	Konrad A. Aniol	01/2000
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