

SUFFOLK COUNTY COMMUNITY COLLEGE

COLLEGE COURSE SYLLABUS FORM

To meet the ideals of Suffolk County Community College, new courses should, if appropriate, consider issues arising from elements of cultural diversity in areas of textbook choice, selection of library and audio-visual materials, and teaching methodology. (Please note that a course syllabus is not the same as a course outline. A course syllabus outlines the general requirements for a course. A course outline is the specific document created by the individual faculty member to distribute to a specific course section. Please see the [Faculty Handbook](#) for further details as to what to include in a course outline. A SAMPLE course outline should be attached below.)

I. Course Number and Title:

(Be sure to consider whether this course is a 100- or 200-level course and give a rationale for the decision.)

PHY230 Physics 2

II. Catalog Description:

PHY230: Introduction to electricity and magnetism, Coulombs Law, Gauss's Law, potential, Lenz's Law, Ampere's Law, Faraday's Law, inductance, magnetic materials. (4 hrs, lecture/recitation.) Prerequisites: MAT142, PHY130. Corequisite: PHY232.

Note: Fulfills SUNY General Education Requirements for Natural Sciences.

III. *Learning Outcomes: *(Main concepts, principles, and skills you want students to learn from this course)*

Upon completion of this course, students will be able to:

- A. Solve word problems in the areas of gravity, electrostatics, DC Circuits, capacitors, inductors and resistors, the effect of magnetic fields on charged particles and current elements and the origins of magnetic fields.
- B. Understand the concepts of fields and potentials at a level appropriate to someone beginning the study of engineering or physical science.
- C. Apply the laws of physics to describe electricity and magnetism at a level appropriate to someone beginning a study of engineering/physical sciences.
- D. Apply the use of integral calculus using a problem-solving approach in each of the areas listed in the catalog description.
- E. Understand how physical phenomena can be organized into a few qualitative and quantitative models.
- F. Transfer successfully into an engineering/physical science program at a four-year institution.
- G. Apply critical thinking skills in order to analyze multi-step word problems to formulate solutions.

IV. Programs that Require this Course: *(List or indicate none.)*

- Engineering Science / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Physics option / A.S. Degree

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- Liberal Arts and Sciences: Science Emphasis – Chemistry option / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Astronomy option / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Geology option / A.S. Degree
- Liberal Arts and Sciences: Science Emphasis – Environmental Science Forestry option / A.S. Degree

V. Major Topics Required:

- A. Application of Newton's Law of Gravity to extended sources (integral approach)
- B. Charge and the motion of charged particles
- C. Electric field and potential
- D. Fundamentals of DC circuits, including resistors and capacitors
- E. Laws: Coulomb, Gauss, Ampère, Biot-Savart, Faraday, Lenz
- F. Magnets and magnetic field
- G. Electromagnetic induction, inductors

VI. Special Instructions:

A. Prerequisite(s) to this Course: *(List or indicate none)*
MAT142, PHY130

B. Course(s) that Require this Course as a Prerequisite:
(List courses or indicate none)
PHY245, PHY247

C. External Jurisdiction: *(List credentialing organization/association if appropriate or indicate none.)*
None.

VII. Supporting Information: *(Examples – newspapers, journals, Internet resources, CD-ROMS, Videos, other teaching materials, textbooks, etc.)*

Required Textbook:

- Physics for Scientists and Engineers, by Giancoli, pub. Pearson

VIII. Optional Topics: *(List or indicate none)*

None.

IX. Evaluation of Student Performance:

List possible methods to be used for evaluating students' achievement of the course's learning outcomes.

Lecture tests/midterm/final, homeworks assignments, quizzes.

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COURSE OUTLINE

Course Number and Title: PHY 230 Physics II

1. OUTCOMES OF THE COURSE:

Upon completion of this course, students will be able to:

- A. Solve word problems in the areas of gravity, electrostatics, DC Circuits, capacitors, inductors and resistors, the effect of magnetic fields on charged particles and current elements and the origins of magnetic fields.
- B. Understand the concepts of fields and potentials at a level appropriate to someone beginning the study of engineering or physical science.
- C. Apply the laws of physics to describe electricity and magnetism at a level appropriate to someone beginning a study of engineering/physical sciences.
- D. Apply the use of integral calculus using a problem-solving approach in each of the areas listed in the catalog description.
- E. Understand how physical phenomena can be organized into a few qualitative and quantitative models.
- F. Transfer successfully into an engineering/physical science program at a four-year institution.
- G. Apply critical thinking skills in order to analyze multi-step word problems to formulate solutions.

2. PROCEDURES FOR ACCOMPLISHING THESE OUTCOMES:

List of possible methods to be used for achievement of the course's outcomes:

Lectures, classroom discussions, analyzing and solving word problems in-class, assigning & checking homework, use of visual aids (including online videos and/or simulations), demonstrations.

3. STUDENT REQUIREMENTS FOR COMPLETION OF THE COURSE:

List of possible requirements (subject to the specific procedures chosen above) for completion of the course:

- Complete all non-optional lecture tests (STRONGLY REQUIRED).
- Submit periodic homework assignments on time.
- Complete periodic quizzes.
- Read all of the assigned chapters in the textbook.
- Participate in classroom discussions.
- Participate in analyzing and solving analytical problems in class.

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4. TEXTBOOK:

Required Textbook:

- Physics for Scientists and Engineers, by Giancoli, pub. Pearson

5. WEEKLY OUTLINE TOPICS TO BE COVERED:

This is a suggested schedule, with exams. Instructors always have the flexibility to adjust the timeline of this schedule and number of exams according to their needs. However, the topics listed below should be followed closely.

Week 1	<ul style="list-style-type: none">Applications of Newton's law of gravity to extended sources (integral approach)
Week 2	<ul style="list-style-type: none">Introduction to electrostatic; Coulomb's law; use Coulomb's law to calculate the electric force between charges
Week 3	<ul style="list-style-type: none">Electric field; use Coulomb's law to calculate the electric field at a point in space due to different distribution of charges Exam
Week 4	<ul style="list-style-type: none">Gauss's Law and applications
Week 5	<ul style="list-style-type: none">Electric potential; calculate electric potential due to any charge distribution; electrostatic potential energy
Week 6	Exam <ul style="list-style-type: none">Capacitance; dielectrics; electric energy storage
Week 7	<ul style="list-style-type: none">Electric currents and resistance
Week 8	
Week 9	<ul style="list-style-type: none">DC circuits in series and parallel; Kirchhoff's rules; ammeters and voltmeters Exam
Week 10	<ul style="list-style-type: none">Magnetic field; force on electric charges moving in magnetic field; Lorentz equation; Hall effect
Week 11	
Week 12	<ul style="list-style-type: none">Ampere's law; Biot-Savart law
Week 13	<ul style="list-style-type: none">Faraday's law; electromagnetic induction; inductors; inductance; magnetic field energy; LR circuits
Week 14	
Week 15	Exam(s)

6. LIST OF SUPPLEMENTARY READINGS:

None.

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