

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences

Revision Date: 07-01-20

[Syllabus Statements](#)

I. CATALOG DESCRIPTION

Course Number: PHYS2120
Course Title: General Physics II with Calculus
Prerequisite(s): PHYS2110 – General Physics I or equivalent
Catalog Description: Detailed calculus-based continuation of General Physics I. Topics covered will include electricity, magnetism, and optics. Additional topics from the areas of waves and modern physics may also be covered.
Credit Hours: 5
Class Hours: 60
Lab Hours: 30
Total Contact Hours: 90

II. COURSE OBJECTIVES: *Course will:*

- A. Introduce the concepts and applications of electrostatics.
- B. Provide methods of analyzing the electric fields, forces, and potential.
- C. Introduce basic information on capacitance including concepts and calculations.
- D. Define concepts and techniques for direct-current circuit analysis.
- E. Introduce the concepts of magnetism.
- F. Provide methods of analyzing magnetic fields and forces.
- G. Present concepts and applications of electromagnetic induction.
- H. Implement concepts and techniques to analyze alternating current circuits.
- I. Employ the basic principles of wave motion and wave interaction, including how they apply to electromagnetic waves.
- J. Present concepts and applications of geometric optics.
- K. Present techniques for analysis of experimental data.
- L. Provide experience communicating experimental results.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Apply the concepts of electrostatics.
 - 2. Analyze electric fields, forces, and potential.
 - 3. Explain the basic concepts and applications of capacitance.
 - 4. Perform analysis of direct-current circuits.
 - 5. Apply the concepts of magnetism.
 - 6. Perform calculations involving magnetic fields and forces.
 - 7. Explain the concepts of electromagnetic induction.
 - 8. Implement concepts and techniques to analyze alternating current circuits.
 - 9. Employ the basic principles of wave motion and wave interaction, including how they apply to electromagnetic waves.
 - 10. Demonstrate the concepts and applications of geometric optics.
 - 11. Use various techniques to collect and analyze experimental data.
 - 12. Communicate experimental results.
 - 13. Employ the basic principles of wave motion and wave interaction as they apply to electromagnetic radiation (light) in various medic.
- B. General Education Learning Outcomes
 - 1. GELO #3: Critical Thinking & Problem Solving

Outcome: Collect, identify, interpret and analyze data.

Outcome: Synthesize information to arrive at reasoned solutions to problems.

Outcome: Evaluate ideas presented in writing, media, speech, or artistic presentations.

Outcome: Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.

Outcome: Acquire and integrate knowledge and construct relationships across disciplines.

2. GELO #5: Analytical, Quantitative, and Scientific Reasoning

Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.

Outcome: Understand and create logical arguments supported by quantitative and scientific evidence and communicate those arguments in a variety of formats.

Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.

Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A. Electric Charges and Fields
- B. Gauss's Law
- C. Electric Potential
- D. Capacitance
- E. Current and Resistance
- F. Direct-Current Circuits
- G. Magnetic Forces and Fields
- H. Sources of Magnetic Fields
- I. Electromagnetic Induction
- J. Inductance
- K. Alternating-Current Circuits
- L. Electromagnetic Waves
- M. The Nature of Light
- N. Geometric Optics and Image Formation
- O. Interference
- P. Diffraction

V. INSTRUCTIONAL MATERIALS

- A. Suggested Text(s):
 - 1. OpenStax University Physics, University Physics Volume 2. OpenStax CNX, <https://openstax.org/details/books/university-physics-volume-2>.
 - OR
 - 2. OpenStax University Physics, University Physics Volume 3. OpenStax CNX, <https://openstax.org/details/books/university-physics-volume-3>.
 - 3. Knight, Randall D., *Physics for Scientists and Engineers, A Strategic Approach*, 3rd edition, Addison-Wesley, 2008, 978-0-8053-2736-6

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Lectures
 - 2. Small group activities
 - 3. Videos
 - 4. Lab activities

5. Worksheets
6. Quizzes
7. Online exploration
8. Student presentations

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Unit Tests
2. Comprehensive Final Exam
3. Quizzes
4. Assignments
5. Lab activities

B. SCC GRADING SCALE:

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. SPECIFIC COURSE REQUIREMENTS

A. None.