SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-25

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 Fileds
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.