

LAST REVIEW: 2010-11
(i.e. 2003-2004)

NEXT REVIEW: 2015-16
(i.e. 2008-2009)

STATUS: A
(A, I, D)

COURSE TITLE: General Physics with Calculus II

COMMON COURSE NUMBER: PHY 2049

CREDIT HOURS: 4

CONTACT HOUR BREAKDOWN
(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: **64** Lab:

Clinic: Other:

PREREQUISITE(S): PHY 2048 and MAC 2312 with a minimum grade of C

COREQUISITE(S): PHY 2049L and MAC 2313 with a minimum grade of C

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum):*

PHY 2049 is part two of a comprehensive physics course outlining electricity, magnetism and optics using analysis in calculus.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): 4B Area

General Education Requirements – Associate in Science Degree (AS), meets Area(s): 4B Area

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

- 1. Electricity and Magnetism**
- 2. Optics**
- 3. Quantum Theory**

*** Complete the following only if course is seeking general education status ***

GENERAL EDUCATION Competencies and Skills *:

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

Course must include <u>all</u> of the following:	
1. Read with critical comprehension**	1.0, 2.0, 3.0
2. Write clearly and coherently**	1.0, 2.0, 3.0
3. Demonstrate literacy as appropriate within a given discipline**	E: 1.0, 2.0, 3.0 F: 1.0, 2.0, 3.0
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**	1.0, 2.0, 3.0
Course must include at least <u>one</u> of the following:	
5. Differentiate between ethical and unethical behavior	
6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.	1.0, 2.0, 3.0
7. Demonstrate an understanding of and appreciation for human diversities and commonalities.	
8. Speak and listen effectively.	

**General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

****Required Competencies**

1) Read with critical comprehension.

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

2) Write clearly and coherently.

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one’s own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.
- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.

g) Environmental literacy is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	1.0, 2.0, 3.0
2. Short essays	
3. Research Papers	1.0, 2.0, 3.0
4. Group projects	
5. Discussions (In class and online)	
6. Multiple Choice tests	1.0, 2.0, 3.0
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	1.0, 2.0, 3.0
10. Take-home tests	1.0, 2.0, 3.0
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	1.0, 2.0, 3.0
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	

Common Course Number: PHY 2049

UNITS

Unit 1 Electricity and Magnetism

General Outcome:

- 1.0 The student shall:** be able to analyze how electrical and magnetic fields combine to create the electromagnetic force in electrical circuits. The student will read the course materials critically and create written solutions that will allow for analysis of these circuits.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1. Analyze Coulomb's law in two- and three-dimensional charge configurations.
- 1.2. Analyze the concept of electric field to discrete and continuous bodies using Gauss's Law.
- 1.3. Analyze Ohm's Law and Kirchhoff's Laws to solve simple and compound circuits to create voltage and power relationships in RCL AC circuits.
- 1.4. Analyze magnetic fields effects on moving charged particles and current-bearing wires using Ampere's Laws and Biot-Savart's Laws.
- 1.5. Analyze electromagnetic fields using Faraday's and Lenz's Laws to determine the magnitude and direction of the electromagnetic force.

Common Course Number: PHY 2049

Unit 2 Optics

General Outcome:

- 2.0 The student shall:** be able to analyze problems involving geometrical and physical optics. The student will read the course materials critically and create written solutions that will allow for analysis of optical systems.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1.** Analyze the law of reflection and Snell's Law of Refraction to various optical boundaries.
- 2.2.** Construct ray diagrams for mirrors and lenses.
- 2.3.** Analyze thin-film and double-slit interference, single-slit diffraction patterns, emission and absorption spectra and polarization affects using electric and magnetic field vectors.

Common Course Number: PHY 2049

Unit 3 Quantum Theory

General Outcome:

- 3.0 The student shall:** be to analyze concepts of quantum theory and probability waves. The student will read the course materials critically and create written solutions that will allow for analysis of quantum theory.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

3.1. Analyze the following concepts:

3.1.1. The deBroglie wavelength.

3.1.2. The photoelectric effect.

3.1.3. Radioactive decay.

3.2. Analyze particle behavior using a one-dimensional particle in the box.