

LAST REVIEW: 2010-11 **NEXT REVIEW: 2015-16** **STATUS: A**
(i.e. 2003-2004) *(i.e. 2008-2009)* *(A, I, D)*

COURSE TITLE: General Physics with Calculus I Laboratory

COMMON COURSE NUMBER: PHY 2048L

CREDIT HOURS: 1

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS:

(Voc. Course ONLY)

Lecture: Lab: **32**

Clinic: Other:

PREREQUISITE(S):

COREQUISITE(S): PHY 2048

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum):*

PHY 2048L is a laboratory which allows students to able to collect and analyze data in a variety of experiments covering topics covered in its companion course PHY 2048. Students will create experiment reports using analysis in calculus.

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

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

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

UNIT TITLES

- 1. Laboratory Safety**
- 2. Data Collection**
- 3. Data Analysis and Deductive Reasoning**
- 4. Dynamics**
- 5. Harmonic Motion**
- 6. Moment of Inertia and Angular Momentum**

*** 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**	2.0
2. Write clearly and coherently**	3.3, 3.6
3. Demonstrate literacy as appropriate within a given discipline**	A: 2.3, 2.4, 1.1 B: 2.1, 2.2, 1.2, 1.3 C: 1.0 E: 3.1, 3.2, 3.3, 3.4, 3.5 F: 3.6, 3.7, 3.0, 4.0, 5.0, 6.0
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**	2.0, 3.0, 4.0, 5.0, 6.0
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.	3.6, 3.7
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	
2. Short essays	
3. Research Papers	2.0, 3.0, 4.0, 5.0, 6.0
4. Group projects	
5. Discussions (In class and online)	
6. Multiple Choice tests	
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	1.0, 2.0, 3.0, 4.0, 5.0, 6.0
10. Take-home tests	
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	Laboratory Reports: 2.0, 3.0, 4.0, 5.0, 6.0

Common Course Number: PHY 2048L

UNITS

Unit 1: Laboratory Safety

General Outcome:

- 1.0** The students shall be able to (1) conduct an experiment using proper safety procedures, (2) recognize and deal with potentially hazardous situations, (3) demonstrate an understanding for the necessity of safe laboratory procedures, and (4) collaborate with fellow students to perform laboratory experiments.

Specific Measurable Learning Outcomes:

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

- 1.1.** Interpret the safety rules as provided by the instructor.
- 1.2.** Explain why these safety rules are important.
- 1.3.** Locate and describe the use of safety equipment including the following
 - 1.3.1.** Fire extinguisher
 - 1.3.2.** Fire blanket(s)
 - 1.3.3.** Eye wash
- 1.4.** Create a group which will collaborate on laboratories.

Common Course Number: PHY 2048L

Unit 2 Data Collection

General Outcome:

- 2.0 **The student shall:** be able to perform experiments correctly and collect data accurately.

Specific Measurable Learning Outcomes:

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

- 2.1 Utilize basic measuring devices such as rulers, micrometers, vernier calipers, protractors, thermometers, balances, etc.
- 2.2 Assemble and use correctly the appropriate equipment for a given experiment.
- 2.3 Follow the procedures correctly and safely in performing experiments.
- 2.4 Collect and accurately record data.

Common Course Number: **PHY 2048L**

Unit 3 Data Analysis and Deductive Reasoning

General Outcome:

- 3.0 The student shall:** be able to analyze the data collected for the purpose of forming conclusions. Students will evaluate the data based on ideas learned in lecture and previous knowledge.

Specific Measurable Learning Outcomes:

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

- 3.1.** Identify and trace error propagation in mathematical operations.
- 3.2.** Define and apply the concepts of percent error, percent difference, mean, and standard deviation to analyze data.
- 3.3.** Analyze and plot data using the method of least squares to find the best fit in order to derive relationships among variables.
- 3.4.** Analyze an answer for its reasonableness.
- 3.5.** Perform calculations based on the equations from lecture topics.
- 3.6.** Write a report with a clear statement of the laboratory purpose and procedures ending with a conclusion of concepts learned from the lab.
- 3.7.** Analyze lecture topics with respect to laboratory conclusions.

Common Course Number: **PHY 2048L**

Unit 4 Dynamics

General Outcome:

4.0 The student shall: be able to analyze experiments on dynamic systems. Students will evaluate the experiments based on ideas learned in lecture and previous knowledge.

Specific Measurable Learning Outcomes:

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

- 4.1.** Compare the difference of graphical methods of adding vectors to the actual addition of forces.
- 4.2.** Calculate the path of a projectile in a gravity field.
- 4.3.** Analyze the path of a object experiencing centripetal acceleration.

Common Course Number: PHY 2048L

Unit 5 Harmonic Motion

General Outcome:

- 5.0 The student shall:** be able to analyze experiments harmonic motion. Students will evaluate the experiments based on ideas learned in lecture and previous knowledge.

Specific Measurable Learning Outcomes:

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

- 5.1.** Analyze the motion of an object experiencing different types of harmonic motion; i.e. the motion in a pendulum, spring, etc.
- 5.2.** Calculate the wavelength of a standing wave in a string.

Common Course Number: **PHY 2048L**

Unit 6 Moment of Inertia and Angular Momentum

General Outcome:

- 6.0 The student shall:** be able to analyze experiments on the moment of inertia and angular momentum. Students will evaluate the experiments based on ideas learned in lecture and previous knowledge.

Specific Measurable Learning Outcomes:

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

- 6.1.** Calculate the torque of on an object that is experiencing angular motion.
- 6.2.** Analyze how moment of inertia is related to torques and the moment of inertia.
- 6.3.** Calculate the center of mass of a solid object and analyze its motion about its center of mass.