



BROWARD COMMUNITY COLLEGE COURSE OUTLINE

LAST REVIEW: 2009-10

(i.e. 2003-2004)

NEXT REVIEW: 2014-15

(i.e. 2008-2009)

STATUS: A

(A, I, D)

COURSE TITLE: PHY 3023 General Physics Survey

COMMON COURSE NUMBER: PHY 3023

CREDIT HOURS: 3

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS:

(Voc. Course ONLY)

Lecture: **48**

Lab:

Clinic:

Other:

PREREQUISITE(S): MAC 1105 with a minimum grade of C

COREQUISITE(S): PHY 3023L

PRE/COREQUISITE(S): MAC 1114

COURSE DESCRIPTION *(750 characters, maximum):*

A general physics course employing algebra, trigonometry, and a survey of classical/modern experiments to explain the quantitative aspects of mechanics wave motion, thermodynamics, electricity, magnetism, and nuclear processes.

UNIT TITLES

- 1. Measurement and Vectors**
- 2. Mechanics**
- 3. Oscillations and Wave Motion**
- 4. Thermodynamics**
- 5. Optics**
- 6. Quantum Theory**



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EVALUATION:

Assessment will be the form of homework, quizzes, tests, and final projects.

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

GENERAL EDUCATION Competencies and Skills*:

Please highlight in **green** font all Competencies/Skills from the list below that apply to this course. In the box to the right of the Competency/Skill, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 5.12) that apply.

1. Read with critical comprehension	NA
2. Speak and listen effectively	NA
3. Write clearly and coherently	NA
4. Think creatively, logically, critically, and reflectively (analyze, synthesize, apply, and evaluate)	NA
5. Demonstrate and apply literacy in its various forms: <i>(highlight in green ALL that apply)</i> (1. technological, 2. informational, 3. mathematical, 4. scientific, 5. cultural, 6. historical, 7. aesthetic and/or 8. environmental)	NA
6. Apply problem solving techniques to real-world experiences	NA
7. Apply methods of scientific inquiry	NA
8. Demonstrate an understanding of the physical and biological environment and how it is impacted by human beings	NA
9. Demonstrate an understanding of and appreciation for human diversities and commonalities	NA
10. Collaborate with others to achieve common goals.	NA
11. Research, synthesize and produce original work	NA
12. Practice ethical behavior	NA
13. Demonstrate self-direction and self motivation	NA
14. Assume responsibility for and understand the impact of personal behaviors on self and society	NA
15. Contribute to the welfare of the community	NA

* General Education Competencies and Skills endorsed by '05-'06 General Education Task Force



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UNITS

Unit 1 Measurement and Vectors

General Outcome:

1.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 1.1. Define and apply the units of the SI system of measurement.
- 1.2. Solve problems using dimensional analysis.
- 1.3. Differentiate between scalar and vector quantities and be able to manipulate them algebraically.
- 1.4. Perform basic vector operations of addition and subtraction.



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Unit 2 Mechanics

General Outcome:

2.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 2.1. Apply the equations of motion to the solution of one and two-dimensional motion problems.
- 2.2. Apply radial and tangential vectors to the solution of rotational motion problems.
- 2.3. Relate the description of the motion of a particle with respect to a second (moving) coordinate system, i.e., relative motion.
- 2.4. Define and apply Newton's three laws of motion to the solution of rotating and non-rotating systems.
- 2.5. Create force diagrams as a technique for solving physics problems.
- 2.6. Define and apply the concept of friction to physics problems.
- 2.7. Define and apply the law of universal gravitation to the solution of problems.
- 2.8. Define and apply the concept of work to the solution of problems using the work-energy theorem.
- 2.9. Define and apply the equations of kinetic energy and potential energy to the solution of problems.
- 2.10. Define and apply the concept of power to the solution of problems.
- 2.11. Distinguish between conservative and non-conservative forces and systems.
- 2.12. Compute the potential energy associated with a given conservative force.
- 2.13. Define and apply the concept of conservation of energy, linear momentum and angular momentum to the solution of problems.
- 2.14. Define and apply the concept of impulse to the solution of problems.
- 2.15. Distinguish between elastic and inelastic collisions.



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- 2.16. Apply the laws of Newton to solve problems dealing with a rigid body in equilibrium.
- 2.17. Apply the "free body" concept in solving equilibrium problems.
- 2.18. Define torque and angular momentum.
- 2.19. Solve problems dealing with the conservation of torque and angular momentum.
- 2.20. Differentiate among work, energy and power in rotational motion.
- 2.21. Apply the laws of conservation of mechanical energy to a rotational system in equilibrium.
- 2.22. Calculate the moment of inertia using algebraic methods.



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Unit 3 Oscillations and Wave Motion

General Outcome:

3.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 3.1. Apply the equations of motion of a particle to a simple harmonic oscillator.
- 3.2. Define the terms used in a simple harmonic oscillator such as angular frequency, amplitude, period, etc.
- 3.3. Describe sound as a wave phenomenon as it moves through different forms of matter.
- 3.4. Describe the different acoustical phenomena such as standing waves, the Doppler effect, etc.
- 3.5. Define and apply the concept of sound intensity level to the solution of problems.



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Unit 4 Thermodynamics

General Outcome:

4.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 4.1. Define temperature
- 4.2. Define the terms used in thermodynamics such as heat, specific heat, calorimeter, heat capacity, adiabatic, etc.
- 4.3. Describe the thermal expansion of solids, liquids and gases, and thermal phenomena associated with change of phase.
- 4.4. Describe and apply the laws of thermodynamics to problem solving.
- 4.5. Define and apply the concepts of thermal transport as it applies to steam engines, efficiency of the engines.
- 4.6. Define and apply the concept of entropy to the solution of problems.



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Unit 5 Electricity and Magnetism

General Outcome:

5.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 5.1. Analyze and solve electrostatics problems that involve:
 - 5.1.1. Applying Coulomb's Law to two and three dimensional charge configurations
 - 5.1.2. Defining and applying the concept of electric field to discrete and continuous bodies
 - 5.1.3. Applying Gauss's Law to find electric fields of symmetric geometries
 - 5.1.4. Defining and applying the concept of electric potential and potential energy to discrete and continuous bodies

- 5.2. Analyze and solve circuit problems that involve:
 - 5.2.1. Using Ohm's Law and Kirchhoff's Laws to solve simple and compound circuits
 - 5.2.2. Solving problems involving voltage, and power relationships in all circuits



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Unit 6 Optics

General Outcome:

6.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 6.1. Analyze and solve geometric optics problems that involve
 - 6.1.1. Applying the law of reflection and Snell's Law of Refraction to various optical boundaries, i.e., the ideas of Total Internal Reflectance
 - 6.1.2. Constructing ray diagrams for mirrors and lenses
- 6.2. Analyze and solve physical optics problems that involve
 - 6.2.1. Thin-film and double-slit interference
 - 6.2.2. Single-slit diffraction patterns
 - 6.2.3. Emission and absorption spectra
 - 6.2.4. Polarization effects using electric and magnetic field vectors



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Unit 7 Quantum Theory

General Outcome:

7.0 The student shall:

Specific Measurable Learning Outcomes:

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

- 7.1. Analyze and solve problems that involve:
 - 7.1.1. The deBroglie wavelength.
 - 7.1.2. The photoelectric effect.
 - 7.1.3. Radioactive decay.