

Montgomery County Community College
 PHY 122
 General Physics II
 (Algebra-based)
 4-3-3

COURSE DESCRIPTION:

This course, designed for liberal arts and life science majors, is an algebra-based approach to the experimental and analytical study of oscillations, wave motion, acoustics, electrostatics, electric fields, basic direct-current circuits, magnetism, electromagnetic induction, light, and optics. The course also introduces students to the basic concepts of modern physics. This course is subject to a course fee. Refer to <http://mc3.edu/adm-fin-aid/paying/tuition/course-fees> for current rates.

REQUISITES:*Previous Course Requirements*

- High school algebra or MAT 011 Beginning Algebra or MAT 011B Beginning Algebra with Review of Arithmetic with a minimum grade of “C”

Concurrent Course Requirements

None

COURSE COMMENT

PHY121 General Physics I (Algebra-based), is strongly recommended, but not required

| LEARNING OUTCOMES Upon successful completion of this course, the student will be able to: | LEARNING ACTIVITIES | EVALUATION METHODS |
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| 1. Recognize basic physical quantities and the units associated with them. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 2. Explain how various physical quantities are related to each other. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |

| LEARNING OUTCOMES | LEARNING ACTIVITIES | EVALUATION METHODS |
|--|--|--|
| 3. Describe and use the scientific method as applied to problems in classical physics. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 4. Use basic physical principles to solve practical problems. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 5. Solve physics-related problems in a rigorous and orderly manner. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 6. Recognize the basic physical principles behind the operation of current technologies. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 7. Devise, perform, and analyze properly controlled experiments to test hypotheses. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |

| LEARNING OUTCOMES | LEARNING ACTIVITIES | EVALUATION METHODS |
|---|--|--|
| 8. Use experimental evidence to form tentative interpretations and conclusions. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 9. Assign meaningful measurement uncertainties and identify reasonable sources of experimental error. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 10. Communicate experimental results through written lab reports. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 11. Use basic laboratory equipment in a safe and appropriate manner. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |
| 12. Interpret the graphical representation of various physical quantities. | Lecture Small Group Discussions Laboratory Experiments Demonstrations AV/Multimedia Materials Daily Reading Problem-Solving Assignments | Homework/Quiz Laboratory Report Section Examinations Final Exam |

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The

benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS:

1. Simple Harmonic Motion
2. Waves and Harmonic Waves
3. Sound
4. Standing Waves
5. Electric Charge and Electric Fields
6. Electric Potential
7. Capacitance
8. Current and Resistance
9. DC Circuits
10. Magnetism and Magnetic Fields
11. Charged Particles in Magnetic Fields
12. Faraday's Law of Electromagnetic Induction
13. AC Circuits
14. Electromagnetic Waves and the Nature of Light
15. Mirrors and Lenses
16. Compound Optical Systems
17. Interference of Light
18. Diffraction of Light

SEQUENCE OF EXPERIMENTS:

1. Simple Harmonic Motion
2. Standing Waves and Resonance
3. Mapping Electric Fields
4. The Oscilloscope
5. Basic DC Circuits
6. RC Time Constant
7. Charged Particles in Magnetic Fields
8. Electromagnetic Induction
9. AC Circuits
10. Optics I – Mirrors and Lenses
11. Optics II – Compound Optical Systems
12. Interference of Light
13. Diffraction of Light
14. Atomic Spectra

LEARNING MATERIALS:

Textbook:

Giancoli. (2013) *Physics: Principles with Applications* (7th ed.). Pearson.

Physics Computer Lab (Science Center 216)

Tutorial Services

Scientific calculator (logarithms, exponential, powers, roots, etc.)

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by: Thomas French, Assistant Professor of Physics Date: 4/11/2006

Revised by: Thomas French, Assistant Professor of Physics Date: 2/6/2009

VPAA/Provost Compliance Verification: Dr. John C. Flynn, Jr. Date: 9/11/2009

Revised by: Xingshu Zhu, Assistant Professor of Physics Date: 2/6/2013

VPAA/Provost or designee Compliance Verification:
Victoria L. Bastecki-Perez, Ed.D. Date: 4/25/2013

Revised by: Debbie Dalrymple Date: 6/27/2016

VPAA/Provost or designee Compliance Verification: Date: 6/27/2016



This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.