Bergen Community College
Division of Mathematics, Science and Technology
Department of Physical Sciences
Course Syllabus
PHY-186 General Physics I

Semester and year:
Course Number:
Meeting Times and Locations:

Instructor:
Office Location:
Phone:
Office Hours:
Email Address:

COURSE TITLE AND NUMBER: General Physics I; PHY-186

PRE-REQUISITE: Intermediate Algebra; MAT-045, with a grade of "C" or better

RECOMMENDED PRE-REQUISITE: High School Trigonometry and Introduction to Physics; PHY-185, or, one year of high school physics

CO-REQUISITE: None

COURSE CREDITS: 4

COURSE HOURS: 3 lecture hours; 3 laboratory hours

COURSE CLASSIFICATION: General Education Course

COURSE DESCRIPTION: General Physics I is the first half of a two-semester, algebra-based physics sequence, and is a study of mechanics (motion, forces, and the conservation laws), waves, sound, and fluids. It covers kinematics, dynamics, energy, momentum, rotation, and the mechanical properties of matter. The laws of physics are investigated and applied to problem solving.


STUDENT LEARNING OUTCOMES: The student will develop and describe the meaning behind physical principals and laws discussed in this course. The student will also be able to demonstrate the following skills:

1. Precise use of language as it relates to the description of physical processes and problem solving.
2. Precise use of diagrams and graphs, to help describe physical processes and solve problems.
3. Precise use of mathematics for the description of physical processes and problem solving.
4. Precise use of laboratory instrumentation as it relates to physical processes and the acquisition of data.

These skills are important in many areas where this course is part of a curriculum for future endeavors such as medicine and other areas in the health professions, technology, electronics technology, etc.
The grade for the course is weighted according to the percentages found in the following two schemes:

**Scheme A:**
- Lowest exam grade does not occur on the Final Exam.
- 25% Laboratory Grade
- 45% Highest Three Exam Grades (including final)
- 0% Lowest Exam Grade (Drop)
- 30% Final Exam Grade

**Scheme B:**
- Lowest exam grade occurs on the Final Exam
- 25% Laboratory Grade
- 60% Highest Three Exam Grades (averaged)
- 15% Final Exam Grade

At least 70% of the labs must be performed and handed in to pass the course no matter how high the test scores. Student must attend the lab from the start of class.

Any exam which is missed due to an unexcused absence will count as a zero. Exams missed due to an excused absence may be made up if a) the instructor is notified in writing in advance or b) upon showing of proper documentation (doctor’s note, death notice, subpoena, etc.) of the reason for absence. Missed exams must be made up within one week of the date of the original exam. Missed labs may not be made up, however a complete lab report based on lab partners data may be handed in for up to 50% credit.

Essay questions on exams and laboratory reports will be used to assess the students' knowledge of physical principles and understanding of problem solving techniques. Physical problems will be given on exams and laboratory reports which will require:

1. The reading of graphs and the construction of graphs.
2. Solution of word problems by the use of precise sketches and diagrams, correct application of physical principles, and the correct use of computational skills.
3. Solution of problems requiring elementary algebraic and trigonometric skills.
4. Short answer questions involving definitions and possibly multiple choice.

**INFORMATION LITERACY:** The instructor will assign either a short paper or parts of laboratory reports to meet the college’s requirement for information literacy. This will be part of the Laboratory Grade.

**CHEATING/PLAGIARISM:** Physics 186 follows a Zero Tolerance Policy towards Cheating/Plagiarism. The definition and consequences of Cheating/Plagiarism are described in the Bergen Community College Catalog under ACADEMIC REGULATIONS.

**CLASS ATTENDANCE/LATENESS POLICIES:** Class Attendance is defined in the Bergen Community College Catalog under Class Attendance:

All students are expected to attend punctually every scheduled meeting of each course in which they are registered. Attendance and lateness policies and sanctions are to be determined by the instructor for each section of each course. These will be established in writing on the individual course outline. Attendance will be kept by the instructor for administrative and counseling purposes.

**ABSENCE OF INSTRUCTOR:** Instructor Absence is defined in the Bergen Community College Catalog under Absence of Instructor which reads, in part:

"Students are expected to wait twenty minutes for a faculty member to come to class."

A daily list of cancelled classes will be posted in the main building and in Ender Hall. Students should consult these cases before going to class. If students find a class cancelled which has not been listed, they should report this to the Divisional Dean's office, S-338, or the Evening Office, L-113.
**ELECTRONIC DEVICES**: The use of portable electronic devices such as cell phones, pagers, laptop or portable computers **is not** permitted while class is in session. Please TURN OFF these devices before entering class. Cell phone calculators are not permitted.

**MATERIALS AND SUPPLIES**: In addition to the required text and laboratory manual the following supplies should be purchased:
1. One package of high quality graph paper.
2. Several #2 (soft) pencils.
3. A pocket-sized scientific calculator (solar cell recommended to avoid battery failure at crucial times). The functions must include direct and inverse trigonometric functions, natural logarithm, and exponents.

**COURSE CONTENTS**:
Overview: Indefinables, Definables, Units
Kinematics: Linear and Curvilinear
Newton's Laws: Linear and Rotational
Conservation of Momentum: Linear and Rotational
Work
Work-Energy
Conservation of Energy
Collisions: Elastic and Inelastic
Power
Fluid Statics: Pascal's Principle, Archimedes' Principle, Surface Tension, Capillary Action
Fluid Dynamics: Bernoulli's Equation, Viscosity, Turbulence, Drag
Elasticity: Hooke's Law, Stress, Strain, Young's Modulus, Shear Modulus, Bulk Modulus
Vibration: Amplitude, Period, Frequency
Simple Harmonic Motion: Spring, Simple Pendulum, Total Energy
Damped Harmonic Motion
Resonance
Travelling Waves: Transverse, Longitudinal, Impedance, Reflection, Transmission
Principle of Superposition: Constructive and Destructive Interference
Beats
Doppler Effect
Standing Waves
Complex Waves: Pitch, Quality, Intensity, Intensity Level

**LABORATORY ASSIGNMENTS**:

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<th>NUMBER</th>
<th>TITLE</th>
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<td>Experimental Error and Data Analysis</td>
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<td>2</td>
<td>Mass, Volume, and Density</td>
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<td>4</td>
<td>The Addition and Resolution of Vectors: The Force Table</td>
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<td>Uniformly Accelerated Motion</td>
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<td>Friction</td>
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<td>Conservation of Linear Momentum</td>
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<td>Projectile Motion: The Ballistic Pendulum</td>
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<td>10</td>
<td>Torques, Equilibrium, and Center of Gravity</td>
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<td>30</td>
<td>Rotational Motion and Moment of Inertia</td>
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<td>31</td>
<td>Elasticity: Young's Modulus</td>
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<tr>
<td>11</td>
<td>Simple Harmonic Motion</td>
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<td>12</td>
<td>Standing Waves in a String</td>
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### TEXT ASSIGNMENTS

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<tr>
<th>READ AND STUDY CHAPTER</th>
<th>SOLVE PROBLEMS</th>
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<tr>
<td>1. Introduction, and Mathematical Concepts</td>
<td>3,7,11,13,21,23,35,53</td>
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<td>2. Kinematics in One Dimension</td>
<td>3,11,17,21,25,41,43,59,61,83</td>
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<td>3. Kinematics in Two Dimensions</td>
<td>1,5,9,17,21,47,57</td>
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#### EXAM #1

| 4. Forces and Newton's Laws of Motion                       | 5,9,19,25,27,31,39,53,67,75 |
| 5. Dynamics of Uniform Circular Motion                      | 1,5,9,15,25,28,33,41       |
| 6. Work and Energy                                          | 1,5,9,15,23,31,49,53       |

#### EXAM #2

| 7. Impulse and Momentum                                     | 1,5,13,19,31,41,49       |
| 8. Rotational Kinematics                                    | 1,5,9,17,23,41,45,53     |
| 9. Rotational Dynamics                                      | 5,15,23,27,39,41,49,59    |

#### EXAM #3

| 10. Simple Harmonic Motion and Elasticity                   | 1,5,9,21,33,43,51,69     |
| 11. Fluids                                                  | 1,9,11,23,39,45,55,63    |
| 16. Waves and Sound                                        | 1,5,13,25,35,61,71,77    |
| 17. The Principles of Linear Superposition and Interference Phenomena | 5,7,13,31,33,41 |

#### THE FINAL EXAM (COMPREHENSIVE)

#### BIBLIOGRAPHY AND SUPPORTING MATERIALS:

- Handouts on Special discussion topics, Collapse of The Tacoma Narrows Bridge, Physics of Cerebral Aneurysms, Surface Tension in Fluids and Computer Exercises

- Sample of Other Algebra based Physics texts:

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All BCC students enrolled in credit courses are entitled to a WebAdvisor account. With WebAdvisor, you may register online, pay your bill, check your schedule, room assignments, GPA, and find out what courses you need to take. To find out more about
WebAdvisor or to sign up online, visit <http://go.bergen.edu>! While there, please make sure you give us your preferred email address. You'll find directions how to do this at <http://go.bergen.edu/email>. 