

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.

REQUIRED TEXT: *Physics*, by John D. Cutnell and Kenneth W. Johnson, David Young and Shane Stadler, John Wiley & Sons, Inc., 2018, 11th Edition. ISBN 978-111-9391869 **or** Vol 1 ISBN 978-111-9460190

REQUIRED LABORATORY MANUAL:

Physics Laboratory Experiments ISBN: 9781305293359 Wilson and Hernandez: Revised Eighth Edition for PHY 186L/280L published by Cengage Learning **or**

Physics Laboratory Experiments, by Jerry D. Wilson and Cecilia A. Hernandez, Houghton Mifflin, Sixth Edition, 2005, ISBN 978-0-618-99823-4 (custom edition only) **or**

Physics Laboratory Experiments ISBN 13-978-1-337-05124-8 for PHY 280 and PHY 186 combined edition

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.

MEANS OF ASSESSMENT/COURSE GRADES/EVALUATION METHODS: 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. At the instructor's option, an excused missed exam grade may be substituted for by the comprehensive final exam grade. 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, A-304, or the Evening Office, C-107.

SERVICES FOR STUDENTS WITH DISABILITIES

Bergen Community College aims to create inclusive learning environments where all students have maximum opportunities for success. Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Specialized Services at 201-612-5269 or via email at ossinfo@bergen.edu for assistance.

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:

<u>NUMBER</u>	<u>TITLE</u>
1	Experimental Error and Data Analysis
2	Mass, Volume, and Density
4	The Addition and Resolution of Vectors: The Force Table

3	Uniformly Accelerated Motion
8	Friction
7	Centripetal Force
5	Conservation of Linear Momentum
6	Projectile Motion: The Ballistic Pendulum
10	Torques, Equilibrium, and Center of Gravity
30	Rotational Motion and Moment of Inertia
31	Elasticity: Young's Modulus
11	Simple Harmonic Motion
12	Standing Waves in a String
32	Air Column Resonance: The Speed of Sound in Air

TEXT ASSIGNMENTS

<u>READ AND STUDY CHAPTER</u>	<u>SOLVE PROBLEMS</u>
1. Introduction, and Mathematical Concepts	3,7,11,13,21,23,35,53
2. Kinematics in One Dimension	3,11,17,21,25,41,43,61,83
3. Kinematics in Two Dimensions	1,5,9,17,21,47,57
EXAM #1	
4. Forces and Newton's Laws of Motion	5,9,19,25,27,35,39,53,67,75
5. Dynamics of Uniform Circular Motion	1,5,9,15,25,28,33,41
6. Work and Energy	1,5,9,15,21,31,49,53
EXAM #2	
7. Impulse and Momentum	1,5,13,19,31,41,51
8. Rotational Kinematics	1,9,11,17,23,41,45,53
9. Rotational Dynamics	5,15,23,27,37,43,49,59
EXAM #3	
10. Simple Harmonic Motion and Elasticity	1,5,9,21,33,43,51,73
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:

College Physics by Raymond A. Serway, Jerry S. Faughn, Chris Vuille, and Charles A. Bennet, 2006 7th edition, ISBN 10:0534997236

Physics: Algebra (Trig) by Eugene Hecht, 2003, 3rd edition, ISBN 10:0534377297

College Physics by Young and Geller, 2007, ISBN 10:0805390707

College Physics, 7th edition, Sears, Zemansky, and Young, 1991, ISBN 10:0201172852

Physics, 5th edition by Beiser, 1991, ISBN 10:0201168677

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