

Bergen Community College
Division of Mathematics, Science and Technology
Department of Physical Sciences
Course Syllabus
PHY-286 General Physics II

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

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

COURSE TITLE AND NUMBER: General Physics II; PHY-286

PRE-REQUISITE: General Physics I; PHY 186, with a grade of "C" or better.

CO-REQUISITE: None

COURSE CREDITS: 4

COURSE HOURS: 3 lecture hours; 3 laboratory hours

COURSE CLASSIFICATION: General Education Course

COURSE DESCRIPTION: General Physics II is the continuation of PHY-186 General Physics I, and is a study of heat, electricity and magnetism, light, and modern physics. It covers thermodynamics, electrostatics, magnetic fields and forces, capacitance and inductance, electrical and electronic circuits, geometrical and physical optics, relativity, and quantum theory.

REQUIRED TEXT: Physics, by John D. Cutnell and Kenneth W. Johnson, David Young and Shane Stadler, John Wiley & Sons, Inc. , 2015, 10th Edition. ISBN 978 111 865 1889 or Vol 2 ISBN 978 111 883 6873 Note you will need Ch 12, 13, 14, 15 from Vol 1 ISBN 978 111 883 6880
or ISBN 978 111 931 6220 (only chapters needed for PHY 286)

REQUIRED LABORATORY MANUAL: Physics Laboratory Experiments For PHY-290/291 and PHY-286, by Jerry D. Wilson and Cecilia A. Hernandez, Cengage Learning, Combined Edition, 2016, ISBN 978-1-337-05570-3 (custom edition only).

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) (averaged)

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)

0% Lowest Exam Grade (Drop)

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.

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.

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.

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.

CHEATING/PLAGIARISM: Physics 286 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:

Thermal Energy, Temperature and Heat

Heat Transfer

Entropy and Thermodynamics

The physics of gases

Electric Force

Electric Energy

Electric Current and Ohm's Law

Direct Current Electric Circuits

Capacitors

Magnetic Forces and Fields

Induced EMF

Light Reflection and Refraction

Optical Instruments

Light Wave Interference and Polarization

Some material from the following topics may be selected for detailed coverage:

Wave Particle Duality

The Bohr Model of the Atom

Quantum Mechanics of Atoms
 The Nucleus and Radioactivity
 Fission, Fusion and Particle physics
 Biological Effects of Ionizing Radiation

LABORATORY ASSIGNMENTS:

<u>NUMBER</u>	<u>TITLE</u>
14	Specific Heats of Metals
33	Heats of Fusion and Vaporization
handout	Boyle's Law
16	Fields and Equipotentials
17	Ohm's Law
20	Resistances in Series and Parallel
34	The Voltmeter and Ammeter
35	Introduction to Oscilloscope
21	The RC Time Constant (Electronic Timing)
handout	e/m experiment`
22	Reflection and Refraction
23	Spherical Mirrors and Lenses
25	The Transmission Diffraction Grating
26	Detection of Nuclear Radiation: The Geiger Counter
27	Radioactive Half-Life

TEXT ASSIGNMENTS

<u>READ AND STUDY CHAPTER</u>	<u>SOLVE PROBLEMS</u>
12. Temperature and Heat	1,5,11,15,25,31,39,49,57,83
13. The Transfer of Heat	3,11,13,19,29,33
14. The Ideal Gas Law and Kinetic Theory	1,5,11,19,31,37,41,47
15. Thermodynamics	3,5,15,17,21,29,35,37,45,53,63,73,77
EXAM #1	
18. Electric Forces and Electric Fields Computer exercise "Electric Field"	1,5,9,11,13,25,27,31,39,55,59
19. Electric Potential Energy and the Electric potential	3,7,11,15,23,27,33,35,39,43,51,55
20. Electric Circuits	3,9,15,19,31,35,39,43,47,51,55,59, 63,65,73,79,85,87,95,103
EXAM #2	
21. Magnetic Forces and Magnetic Fields Computer Exercise "Magnetic Field"	1,3,11,13,17,31,35,41,47,55,57,69
22. Electromagnetic Induction Computer Exercise "Electromagnetic Induction"	5,9,13,17,27,35,41,47,55,63,67
24. Electromagnetic Waves	3,5,9,11,15,27,37,47
EXAM #3	
25. The Reflection of Light: Mirrors	5,9,15,19,24,27,29
26. The Refraction of Light: Lenses and Optical Instruments	1,5,9,21,27,35,37,39,45,47,49,61,69,77,83,91, 99
27. Interference and the Wave nature of light. Computer Exercise "Thin Film Interference"	1,5,13,19,31,35,41,45,51
31. Nuclear Physics and Radioactivity Computer Exercise "Radioactive Decay"	1,5,9,19,33,37,45,47

THE FINAL EXAM (COMPREHENSIVE)

BIBLIOGRAPHY AND SUPPORTING MATERIALS:

Interactive Physics Conceptual Examples Software. Available in free time computer labs and in the bookstore.

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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>.