

GENERAL PHYSICS II

PHY 202

Instructor: Dr. Romulo Ochoa
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Text: "Fundamentals of Physics," Halliday, Resnick, and Walker (9th Ed.)

Lab.: General Physics Lab manual, Ochoa, Kolp, Dalafave, Gleeson, and Pfeiffer

I. Course Description

Calculus based treatment of laws of electrostatics, magnetostatics, electromagnetism, light, and modern physics. Understanding of the important principles is emphasized. Problem solving and laboratory work are integral parts of the course.

II. Course Objectives

1. To provide a foundation in physics necessary for further study in science, engineering and technology.
2. To provide an appreciation of the nature of physics, its methods and its goals.
3. To contribute to the development of the student's thinking process through the understanding of the theory and application of this knowledge to the solution of practical problems.

III. Course Outline

1. Electric charge.- (Ch. 21)
Electric charges, Coulomb's law, conservation of charge. Examples of calculations.
Wiley Plus homework problem set Chapter 21.
 2. Electric Fields.- (Ch. 22)
The electric field. Electric field lines. Electric field due to an electric dipole. Examples of calculations of electric fields. Point charge in an electric field.
Wiley Plus homework problem set Chapter 22.
 3. Electrical potential.- (Ch. 24)
Electric potential energy, potential difference, examples of calculations. Equipotential surfaces. Electric potential energy of a system of point charges.
Wiley Plus homework problem set Chapter 24.
 4. Current, resistance and direct current circuits.- (Ch. 26-27)
Electric current. Current density. Resistivity and resistance. Ohm's Law. Power in circuits. Work energy and electromotive force. Series and parallel circuits. Kirchoff's rules.
Wiley Plus homework problem sets Chapter 26 & Chapter 27.
- Test 1 (TBA)
5. Magnetic fields.- (Ch. 28)
Magnetic force on a charge. Magnetic field lines. Discovery of the electron. Motion of

charged particles in magnetic fields. Magnetic force on a current-carrying wire.
Wiley Plus homework problem set Chapter 28.

6. Magnetic fields due to currents.- (Ch. 29)

Magnetic field due to a current. Calculations of magnetic fields. Forces between parallel conductors.

Wiley Plus homework problem set Chapter 29.

7. Electromagnetic induction.- (Ch. 30)

Demonstration of Induction. Magnetic flux. Faraday's law. Lenz's law.

8. Electromagnetic waves.- (Ch. 33)

Maxwell's rainbow. Traveling electromagnetic waves. Sinusoidal waves. Polarization. Reflection and refraction. Polarization by reflection.

Wiley Plus homework problem set Chapter 33.

Test 2

(TBA)

9. Images.- (Ch. 34)

Types of images. Reflection by plane and spherical surfaces. Refraction by thin lenses. Graphical methods. Optical instruments.

Wiley Plus homework problem set Chapter 34.

10. Interference and diffraction.- (Ch. 35-36)

Interference. Light as a wave. Diffraction. Young's interference experiment. Coherence. Interference from thin films. Michelson's interferometer. Diffraction from a single slit. Diffraction by a circular aperture. Diffraction gratings. X-ray diffraction.

Wiley Plus homework problem sets Chapter 35 & Chapter 36.

11. Photons and matter waves.- (Ch. 38)

Light waves and photons. Photoelectric effect. Electrons and matter waves. Wave-particle duality. Uncertainty principle.

Final Exam

(TBA)

IV. Laboratory

Lab 1. Coefficient of linear expansion.

Lab 2. Specific heat.

Lab 3. Equipotential lines and electric fields.

Lab 4. Peer instruction. Pre-test practice.

Lab 5. Resistance: Ohmic and non-ohmic devices

Lab 6. Series and parallel circuits.

Lab 7. Faraday's Law

Lab 8. Peer instruction. Pre-test practice.

Lab 9. Melde's vibrating string. Resonance of air columns.

Lab 10. Concave mirrors.

Lab 11. Converging lenses

Lab 12. Interference and diffraction

V. Assessment of Student Performance

1. Electronic homework (10% of course grade)
2. Tests (35% of course grade)
3. Final exam (35% of course grade)
4. Lab. grade (20% of course grade)

For lab grade student must complete in a satisfactory manner the laboratory exercises; the laboratory notebook and prepare 1(one) formal report. A student can miss only one lab. Students are expected to be in the lab on time, points will be deducted for tardiness (if a student is more than 20 minutes late he/she will receive an automatic zero grade for that lab).

The lowest test grade will have a weight of 15% towards the final grade while the highest test grade will have a 20% weight.

Grading Scale	
Final Score	Letter Grade
92.5 - 100	A
89.5 - 92.4	A-
86.5 - 89.4	B+
82.5 - 86.4	B
79.5 - 82.4	B-
76.5 - 79.4	C+
72.5 - 76.4	C
69.5 - 72.4	C-
66.5 - 69.4	D+
59.5 - 66.4	D
0 - 59.4	F

VI. Bibliography

Feynman, R., The Feynman Lectures on Physics, Vols. 1,2, & 3, Redwood City, California: Addison-Wesley, 1989.

Serway, R. A., and Jewett, J. W., Principles of Physics, 4th Ed., CA, Thomson- Brooks/Cole, 2006.

Young and Freedman, University Physics 12th ed., New York, Addison-Wesley, 2009.

VII. Attendance

Students are expected to attend class but if they choose not to this will have no negative effect on their grade. Students that do attend and participate or show effort in class may receive extra credit on their tests.

No makeup labs, tests, or exams will be given unless there is an emergency situation. In that case students are expected to contact the instructor no later than 24 hours after the missed lab or test; otherwise they will be given a zero grade for the missed evaluation.

TCNJ's attendance policy can be found at: <http://www.tcnj.edu/~recreg/policies/attendance.html>

VIII. Academic Integrity Policy

Academic dishonesty is any attempt by the student to gain academic advantage through dishonest means, to submit, as his or her own, work which has not been done by him/her or to give improper aid to another student in the completion of an assignment. Such dishonesty would include, but is not limited to: submitting as his/her own a project, paper, report, test, or speech copied from, partially copied, or paraphrased from the work of another (whether the source is printed, under copyright, or in manuscript form). Credit must be given for words quoted or paraphrased. The rules apply to any academic dishonesty, whether the work is graded or ungraded, group or individual, written or oral.

TCNJ's academic integrity policy is available on the web:

<http://www.tcnj.edu/~academic/policy/integrity.html>.

IX Americans with Disabilities Act (ADA) Policy

Any student who has a documented disability and is in need of academic accommodations should notify the professor of this course and contact the Office of Differing Abilities Services (609-771-2571). Accommodations are individualized and in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992.

TCNJ's Americans with Disabilities Act (ADA) policy is available on the web:

<http://www.tcnj.edu/~affirm/ada.html> .