

**PHYS 274 Introduction to Modern Physics
(64062)**

3 Credits

M – Th; 4:00 – 5:35 pm

INSTRUCTOR: Dr. Jacob Hudson
OFFICE: Hale Imiloa 112
OFFICE HOURS: 3:00 to 4:00 pm
TELEPHONE: 235-9112 **EMAIL:** jacobh@hawaii.edu
EFFECTIVE DATE: Summer Session II; 2015 (7/6 to 8/14)

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai'i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide O'ahu's Ko'olau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

CATALOG DESCRIPTION

This course focuses on the study of physical optics, special relativity, quantum mechanics, solid state physics, atomic and nuclear physics, and elementary particle physics.

STUDENT LEARNING OUTCOMES

The student learning outcomes for the course are:

1. Describe the theory of special relativity and its effects: time dilation and space contraction.
2. Describe the particle like properties of electromagnetic radiation as demonstrated in the photoelectric effect and Compton scattering.
3. Analyze the wavelike properties of matter known as quantum theory.
4. Identify and describe knowledge of the different properties of solids such as crystal structure, thermal and magnetic properties, and superconductivity.
5. Describe nuclear structure, radioactive decay, nuclear interactions, and their interactions.
6. Identify the different elementary particles and describe their role in the forces that hold matter together.

LEARNING RESOURCES

Text: **Fundamentals of Physics (8th Edition); D. Haliday, R. Resnick, & J. Walker**
J. Wiley and Sons, Inc.

In addition to the above-mentioned text, students will need a straight edged protractor, and a ‘non-QWERTY’ type calculator. A graphing calculator (such as a TI-85) is highly recommended.

COURSE PHILOSOPHY

Physics is an interesting and challenging subject. It is also the basic science, the foundation of all other physical sciences. Physics attempts to describe the fundamental nature of the Universe and how it works, striving for the simplest explanations common to its diverse behavior. For example, physics explains why the sky is blue, why rainbows have color, what keeps a satellite in orbit, and what atoms and nuclei are made of. In a rapidly changing environment the key to success is adaptability. There is no other field of study available which offers the student greater flexibility in this high tech society of ours. Whether the student is contemplating a career as a scientist, an engineer, a teacher, a physician, a lawyer, or a businessperson, one can get no better grounding in fundamental, logical and critical thinking than is possible in physics.

ASSESSMENT TASKS AND GRADING

Grading: Student assessment will be determined from class participation (~5%), homework (~40%), midterms (~35%) and the Final (~20%). All students are required to take the Final exam in May.

Class Participation – In addition to the class lecture, students are to take part in the problem solving that will be emphasized each class.

Homework – A homework assignment will be given each class. The assignment is due at the beginning of the next class period. No *Late* assignments will be collected.

Exams – There are three midterm exams, each yielding approximately 12% of the overall point total of the semester grade. The final exam is at the scheduled time, and is worth approximately 20% of the overall point total of the semester grade.

Additional Information (tentative schedule)

7/6-8	Interference	Chap. 35
7/9-13	Diffraction	Chap. 36
7/14-16	Relativity	Chap. 37
7/17	Exam 1	
7/20-24	Photons and Matter Waves	Chap. 38 & 39
7/27-30	Atomic Theory	Chap. 40
7/31	Exam 2	
8/3-5	Semiconductors	Chap. 41 (sac)
8/6-7	Nuclear Physics	Chap. 42 & 43
8/10	Exam 3	
8/11-13	Quarks, Leptons, and the Universe	Chap. 44
8/14	Final Exam	

DISABILITIES ACCOMMODATION STATEMENT

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale 'Akoakoa 213 for more information.

Revised May 25, 2011