

Physics for Allied Health (SCIT 1420)



Credit: 4 semester credit hours (3 hours lecture, 2 hours lab)

Prerequisite: MATH 1332

Course Description

An introduction to physics with emphasis on applications to health related fields of study. Topics include forces, motion, work and energy, fluids, heat, electricity and magnetism, wave motion, sound, electromagnetic radiation, and nuclear radiation.

Required Textbook and Materials

1. *Applied Physics* by Dale Ewen, Neill Schurter and P. Erik Gundersen, 9th edition. Pearson Prentice Hall Publishers.
 - a. ISBN number **13:9780135157336**.
2. Scientific calculator.
3. Pens or pencils.

Course Objectives

Upon completion of this course, the student will be able to:

1. Explain and apply the concepts of measurements, standard units, kinematics, forces, and work as applicable to the health fields. (SCANS: F1.4, F2.3, F11.2)
2. Demonstrate knowledge of fluid dynamics, electric circuits, electricity and magnetism, optics and optical instrumentation applicable to health fields. (SCANS: F2.1, F3.5, F8.3, F10.3, F11.3, F12.5, C5.4, C6.4, C7.4)
3. Describe and apply the relationship of electromagnetic radiation, nuclear radiation, and radioactivity as applied to health fields. (SCANS: F1.4, F2.4, F3.5, F5.4, F6.4, F8.4, F9.5, F10.4, F11.4, F12.4, F13.4, F15.5, F16.3, F17.4, C1.4, C3.4, C4.1, C5.4, C6.5, C7.4, C8.1, C9.5, C10.1, C13.2, C14.5, C16.3, C18.5, C19.5, C20.4)
4. Define radioactive isotopes and half-life and summarize their interaction with biological organisms. (SCANS: F1.2, F2.3, F3.4, F5.3, F8.2, F9.4)

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

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Course Syllabi
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Course Outline

- A. Chapter 0 Intro to Physics
 - 1. Class rules
 - 2. Why study physics
- B. Chapter 1 Physics Tool Kit
 - 1. Scientific Notation
 - 2. Significant figures and Accuracy
 - 3. Calculator use
 - 4. Precision
 - 5. Conversions
 - a. British-British
 - b. Metric-Metric
 - c. Metric-British
- C. Chapter 2 Problem Solving
 - 1. Calculations with Significant Digits
 - 2. Basic Algebraic Calculations
 - 3. Problem Solving Method
- D. Chapter 3 Vectors
 - 1. Definitions
 - 2. Solving with graphs
- E. Chapter 4 Motion
 - 1. Velocity
 - 2. Acceleration
- F. Chapter 5 Force
 - 1. Law of Inertia
 - 2. Friction
 - 3. Weight versus weight
- G. Chapter 8 Work and Energy
 - 1. Work
 - 2. Energy
- H. Chapter 10 Simple Machines
 - 1. Levers
 - 2. Pulleys
 - 3. Inclined planes
- I. Chapter 12 Matter
 - 1. Properties of matter
 - 2. Density
- J. Chapter 13 Fluids
 - 1. Hydrostatic Pressure
 - 2. Pascal's Principle
 - 3. Air Pressure
- K. Temperature and Heat Transfer
 - 1. Temperature
 - 2. Heat
 - 3. Heat Transfer
 - 4. Specific Heat
 - 5. Calorimetry
 - 6. Change of Phase
- L. Wave Motion and Sound
 - 1. Sound waves
 - 2. Doppler Effect
 - 3. Resonance
- M. Chapter 20 Light
 - 1. Nature of light
 - 2. Speed of light
- N. Chapter 20 Basic Electricity
 - 1. Simple circuits
 - 2. Laws
 - 3. Instruments
- O. Chapter 18 Magnetism
 - 1. Introduction
 - 2. Applications
- P. Chapter 23 Survey of Modern Physics
 - 1. Atomic structure
 - 2. Radioactivity decay
 - 3. Radiation

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Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Evaluation

Final grades will be calculated according to the following criteria:

1. 4 Major Tests	64%
2. Homework	16%
3. Laboratory	20%

Course Requirements

1. Four major tests including one during the final exam period.
2. Laboratory projects.
3. Chapter homework.

Course Policies

1. Each chapter has assigned homework problems. All homework is due on the testing day for that unit.
2. Makeup exams may only be made up at the instructor's discretion. It is the responsibility of the student to contact the instructor as soon as possible to arrange for a makeup exam.
3. Safety rules must be abided by at all times. Any student who continually breaks the safety rules will be removed from the class to insure the safety of the other students in the class.
4. Children are **not allowed** in either the lecture class or laboratory at any time.
5. **No** food, drinks, or use of tobacco products in class.
6. **Attendance in laboratory sessions is** essential. One makeup session is scheduled for students missing one session.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

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Course Schedule

Week of	Topic	Reference
Week 1	Chapter 0: Intro to Physics Chapter 1: The Physics Tool Kit Lab: Measurements	pp. 2-11 pp. 12-34
Week 2	Chapter 1: continued Chapter 2: Problem Solving Lab: Solving Word Problems	pp. 35-49 pp. 50-56
Week 3	Chapter 2: Problem Solving -continued Chapter 3: Vectors Lab: Resultant Forces	pp. 57-67 pp. 68-72
Week 4	Chapter 4: Motion Lab: Acceleration	pp. 98-110
Week 5	Chapter 5: Force Test: Chapters 0-5 Lab: Friction	pp. 129-142
Week 6	Chapter 8 Work and Energy Lab: Buoyancy	pp. 204-231
Week 7	Chapter 10: Simple Machines Lab: Simple Machines	pp. 266-283
Week 8	Chapter 12: Matter Lab: Density	pp. 308-339
Week 9	Chapter 13: Fluids Test 2: Chapters 8,10,12,13 Lab: Specific Heat	pp. 340-356
Week 10	Chapter 14: Temperature & Heat Transfer Lab: Sound Waves	pp. 366-395
Week 11	Chapter 16: Wave Motion & Sound Lab: Resonance	pp. 420-439
Week 12	Chapter 20: Light Lab: none	pp. 554-564
Week 13	Test 3: Chapters 14,16,20 Chapter 17: Basic Electricity Lab: Light Reflection	pp. 448-497
Week 14	Chapter 18: Magnetism Chapter 21: Reflection & Refraction Lab: Electrical meters	pp. 498-519 pp. 572-585
Week 15	Chapter 23: Survey of Modern Physics Lab: Make-up	pp. 618-635
Week 16	Chapter 23: continued Test 4: Chapters 17,18, 21,23 during Final Exam Period	pp. 636-645