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, 10th edition. Pearson Prentice Hall Publishers.
    a. ISBN-10: 0136116337 or ISBN-13: 9780136116332.
2. Three ring binder.
3. Tabbed dividers.
4. Scientific calculator.
5. 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.
2. Demonstrate knowledge of fluid dynamics, electric circuits, electricity and magnetism, optics and optical instrumentation applicable to health fields.
3. Describe and apply the relationship of electromagnetic radiation, nuclear radiation, and radioactivity as applied to health fields.
4. Define radioactive isotopes and half-life and summarize their interaction with biological organisms.

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 12 Matter
1. Properties of matter
2. Density

H. Chapter 13 Fluids
1. Hydrostatic Pressure
2. Pascal's Principle
3. Air Pressure

I. Temperature and Heat Transfer
1. Temperature
2. Heat
3. Heat Transfer
4. Specific Heat
5. Calorimetry
6. Change of Phase

J. Wave Motion and Sound
1. Sound waves
2. Doppler Effect
3. Resonance

K. Chapter 20 Light
1. Nature of light
2. Speed of light

L. Chapter 20 Basic Electricity
1. Simple circuits
2. Laws
3. Instruments

M. Chapter 18 Magnetism
1. Introduction
2. Applications

N. Chapter 23 Survey of Modern Physics
1. Atomic structure
2. Radioactivity decay
3. Radiation

Grade Scale

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

Course Evaluation

1. 3-4 Unit Tests	50%
2. Comprehensive Final Exam	20%
3. Homework and Class Binder	10%
4. Laboratory	20%

Course Requirements

1. Semester binder containing all handouts, homework, tests, and labs.
2. Laboratory projects.
3. Chapter homework.
4. Unit Tests
5. Comprehensive Final Exam

Course Policies

1. Each unit has assigned homework problems. All homework is due on the testing day for that unit and must be turned in inside a binder containing dividers as assigned by the instructor. <u>All calculations must be shown to receive credit</u>.

Completing only odd problems and skipping even problems will result in a grade of ZERO (0).

2. Makeup work, including labs and 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 makeup work. All makeup work must be completed within one week of the original due date.
3. There is a 20 point penalty for work turned in less than one week late. There is a 50 point penalty for work turned in more than one week late, but less than two weeks late. Work turned in more than two weeks late will not be accepted.
4. Students will not be automatically dropped from the class due to poor attendance or grades. Discontinuing class attendance without properly submitting a drop request will result in a failing grade (F).
5. Students are expected to stay for the full duration of the lab period or until all data is taken, calculations are performed and the lab assignment is turned in. Reports are to be neat and complete. DO NOT USE RED INK. Corrections should be made by a single line through the incorrect data and the correction entered next to the old data. Calculations may be done in pencil, but data should be recorded in ink.
6. 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.
7. All beepers and cell phones need to be turned off unless prior approval has been given by instructor to have them set to vibrate. (Permission will only be given in emergency situations.)
8. Children are **not allowed** in either the lecture class or laboratory at any time.
9. **No** food, drinks, or use of tobacco products in class.
10. Attendance in class is vital to understanding physics. If an absence is unavoidable, arrange with the instructor to attend another session of the class. If you are absent, it is your responsibility to obtain copies of at least two other student's notes and rewrite them in your notebook. If you need further assistance, please sit up an appointment with the instructor for a tutoring session. Excessive unexcused absences (per instructor's discretion) will result in a ten point deduction from the final semester grade. Attendance in lab is mandatory. Missed labs may be made up within one week without penalty at the instructor's discretion. Labs not made up within two weeks will result in a grade of zero (0). A lab that is one day to one week late will incur a 20 point penalty. A lab that is more than one week, but less than two weeks late will incur a 50 point penalty. At the end of the semester, three missed labs (grades of 0) will result in an automatic failing grade (F) for the course.

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.

Course Schedule

Week of	Topic	Reference
Week 1	Chapter 0:Intro to Physics Chapter 1: The Physics Tool Kit	pp. 2-11 pp. 12-49
Week 2	Chapter 1: Continued Chapter 2: Problem Solving	pp. 12-49 pp. 50-67
Week 3	Chapter 2:Problem Solving Continued Chapter 3:Vectors	pp. 50-67 pp. 68-72
Week 4	Chapter 4:Motion	pp. 98-110
Week 5	Chapter 5:Force Test: Chapters 0-5	pp. 129-142 pp. 148-167
Week 6	Chapter 12:Matter	pp. 308-339
Week 7	Chapter 12:Matter Chapter 13:Fluids	pp. 308-339 pp. 340-356
Week 8	Chapter 13:Fluids	pp. 340-356
Week 9	Chapter 14: Temperature & Heat Transfer	pp. 366-395
Week 10	Chapter 14: Temperature & Heat Transfer Test 2: Chapters 12, 13, 14	pp. 366-395
Week 11	Chapter 16:Wave Motion & Sound	pp. 420-439
Week 12	Chapter 20:Light	pp. 554-564
Week 13	Test 3 Chapter 17:Basic Electricity	 pp. 448-497
Week 14	Chapter 18:Magnetism Chapter 21: Reflection & Refraction	pp. 498-519 pp. 572-585
Week 15	Chapter 23:Survey of Modern Physics	pp. 618-645
Week 16	Test 4 Final Exam	

*The instructor reserves the right to make adjustments to this schedule as necessary.