

## PHY 104 – Physics for Today Syllabus

### Credit

3 semester hours

### Prerequisites

None

### Course Description

This is a survey course designed for non-science majors. The mathematics required for this course is minimal and does not go beyond high school algebra

### Rationale for Course

This course has been designed specifically for music and education majors, but all other non-science majors are welcome. To be a well-educated college graduate, your educational experience must include coursework from a variety of disciplines, other than the one you are pursuing. Specifically, thirty semester hours of mathematics/science, behavioral/social science, and humanities/fine arts are required for a baccalaureate degree from Mississippi College. This course's primary intent is to provide three of the thirty semester hours of the mathematic/science component of the General Education core requirement and, in the process, to acquaint the student with the important world of the physical sciences.

### Learning Objectives

- The student will understand the basic tenants of science including the five fundamental physical properties, unit systems, hypotheses and laws, and the Scientific Method
- The student will demonstrate a rudimentary knowledge of physical work, energy, power, forms and sources of energy, conservation of energy, and the mass-energy relationship.
- The student will understand heat, temperature, specific heat, the phases of matter, heat flow, the First and Second Laws of Thermodynamics, and heat engines.
- The student will explain wave motion and the phenomena associated with all wave motion, sound, the physiology of hearing, intensity, loudness, and the Doppler Effect.
- The student will understand the phenomenon of standing waves as they are present in vibrating string and air columns. The student will demonstrate knowledge of pitch, frequency, musical scales, pure and complex tones, the several categories of musical instruments and how they produce "music," basic audio equipment, and basic acoustics.
- The student will demonstrate an understanding of the basics of electricity and magnetism and the relationship between the two.
- The student will explain light in terms of reflection, refraction, dispersion and color, diffraction, scattering, and the Doppler Effect.

### Academic Integrity

Students are expected to be honest and to submit their own work on exams. Strict adherence to the Mississippi College "Honesty Policy" (2009-2010 *Mississippi College Undergraduate Bulletin*, pg. 60) will be followed.

## Course Outline

- Fundamental Physical Properties, Unit Systems, Hypotheses, Laws, Theories, Principles, the Scientific Method, Science in General, Pseudo-Science
- Momentum, Work, Power, Energy, Work and Energy – the relationship, Simple Machines, Kinetic and Potential Energy, Forms of Energy, Change of Energy from one form to another, Conservation of Energy, Mass and Energy – the relationship, Sources of Energy  
Heat Energy & Temperature, Specific Heat, Change of Phase, Heat Flow, The First Law of Thermodynamics, The Second Law of Thermodynamics
- Simple Harmonic Motion, Waves, Transverse Waves, Longitudinal Waves, Superposition of Waves, Things that all waves do, The Ear – the Physiology of Hearing, Intensity, Loudness, Decibels, Doppler Effect
- Standing Waves and Resonance, Vibrating Strings, Vibrating Air Columns, Pitch and Frequency, Musical Scales and Temperament, Pure Tones and Complex Tones, Consonance and Dissonance, Musical Instruments, The Voice, Electronic Instruments, Audio Equipment, Acoustics
- Electricity, What is Electricity?, Static Electricity, Voltage, Current, Resistance, Power, Current Electricity – the Simple Circuit, AC/DC – what’s the difference?, Magnetism, The Source of Magnetism, How electricity & magnetism are related
- What is Light (waves or particles?), Properties of Light, Reflection, Refraction, Dispersion & Color, Diffraction, Scattering, Lasers – how do they work?

## Method of Instruction

This is primarily a lecture and classroom demonstration course. Be prepared to ask questions and participate in occasional classroom discussions. Liberal use of video and web applets will be employed to demonstrate the physical concepts that will be presented.

## Required Text and Materials

Physical Science 8<sup>th</sup> edition, by Bill W. Tillery (required). Also, during exams a simple pocket calculator will be needed. The unit lecture materials will be handed out prior to the start of each unit. These materials consist almost entirely of locally-written lectures which complement the text. Other materials will be distributed as appropriate. Homework will be assigned from the text and it will be graded.

## Grading

The homework grade counts 10% of the final grade, and the four tests (three unit tests and the final exam) all count equally as 90% of the final grade.

Scale:	Grade	Final Average
	A	90–100
	B	80–89
	C	70–79
	D	60–69
	F	0–59

## Makeup Tests

Makeup tests will be given under the following circumstances:

- A test must be missed because of official college activities. When proof of that is provided, special arrangements will be made to give a make-up test.

- A student is ill and has a written excuse from a doctor, medical clinic, or College official

**Absences**

Mississippi College policies on attendance and academic integrity will be observed. Please see the *2009-2010 Mississippi College Undergraduate Bulletin*, pg. 56-57 for additional details of these policies. Students are responsible for all work missed during absences.

**Special Needs**

Students who need special accommodations due to learning, physical, psychological, or other disabilities should contact Dr. Buddy Wagner in the Counseling and Career Development Center. He may be reached by phone at 601-925-3354.