PHY 104 – Physics for Today
Syllabus

Credit
3 semester hours
3 hours of lecture per week

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, coursework in the areas 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 required 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.

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 9th 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

Academic Integrity

Mississippi College students are expected to be scrupulously honest. Dishonesty, such as cheating or plagiarism, or furnishing false information, including forgery, alteration or misuse of University documents, records or identification, will be regarded as a serious offense subject to severe penalty, including, but not limited to, loss of credit and possible dismissal. See the *Mississippi College Student Handbook* or University Policy 2.19 for specific information regarding penalties associated with dishonest behavior at Mississippi College. Copies of the *Mississippi College Student Handbook* are available in the

Office of the Vice President for Enrollment Management and Student Affairs, Nelson 313. Copies of University policies are available on the Mississippi College web site.

Attendance Policy

Class attendance/participation is an essential part of university education, and students are expected to attend/participate regularly and punctually in all classes and laboratories. The responsibility for any work missed as the result of an absence rests entirely with the student. Cumulative absences/nonparticipation may result in a lowered grade or loss of credit for the course. Tardiness is also subject to penalty, as is any failure to complete required class work on time. A student will receive a grade of F immediately upon accumulating the following number of absences, whether excused or unexcused:

- 12 in semester classes meeting three times per week
- 8 in semester classes meeting two times per week

If a student misses more than the number of class periods specified in university policy and believes that there are reasonable explanations for the absences, he/she may appeal the absences to the Dean of the School of Science and Mathematics.

Dropping the Course

Refer to the Mississippi College Academic Calendar for the final drop date for the course. Drops after this date will only be permitted for extreme circumstances and will require approval from the course instructor, department chair, Dean of the School of Science and Mathematics, and the Vice-President for Academic Affairs.

Early Alert System

Mississippi College has adopted the practice of finding students early in the semester who may be exhibiting behaviors that could ultimately have a negative impact on their academic progress. These behaviors are often called "red flag" behaviors and include, but are not limited to, excessive absences, poor test grades, and lack of class participation or evidence of non-engagement. Identifying these behaviors early gives the instructor the opportunity to raise the "red flag" on behalf of a particular student so that the student can take the appropriate action to redirect his/her progress. The system alerts the student, the student's advisor, and the Office of Student Success.

These messages are intended to help a student recognize an area of concern and to encourage him/her to make some choices to improve the situation. When a student receives an Early Alert message, the student should quickly make an appointment to talk with his/her professor about the situation. Also, students can make full use of the Office of Student Success to set academic goals and connect to campus resources.

Students with Disabilities

In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services immediately upon recognition of their disability (if their disability is known they must come in before the semester begins or make an appointment immediately upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (within 3 years).

The student must meet with SCS face-to face and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please

note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in each semester to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan).

Student Counseling Services is located on the 4th floor of Alumni Hall) or they may be contacted via email at mbryant@mc.edu . You may also reach them by phone at 601-925-7790. Dr. Morgan Bryant is director of MC Student Counseling Services.