PHY 252 – Fundamentals of Physics II
Syllabus

Credit
4 semester hours (3 hours of lecture per week, 3 hours of lab per week)

Prerequisites
PHY 251

Course Description
Light, electricity, and magnetism presented with the aid of calculus.

Rationale for Course
Part of the mission of Mississippi College is to stimulate the intellectual development of students through the liberal arts and sciences. Physics is the science that seeks to describe the physical phenomena that are observed in the universe. It is broad ranging, essential to all the sciences, and typically divided into the following sub-fields: classical mechanics, electricity and magnetism, thermodynamics and statistical mechanics, modern physics, and quantum mechanics. The primary focus of this course is to introduce students to the fundamental concepts of optics, electricity, and magnetism with the aid of calculus. Students will develop problem solving skills and learn how to logically approach and evaluate a variety of physical situations related to this topic.

Learning Objectives
Students taking this course will be expected to analyze physical situations by identifying known quantities and developing a plan to solve for desired unknowns. This will be accomplished in the context of optics, electricity, and magnetism by understanding and applying the laws of physics that describe these types of systems. Through the lecture and laboratory components of the course, students will:

- Become proficient in the use of algebra and calculus to describe and analyze physics problems in a variety of areas.
- Understand electromagnetic phenomena using classical electrical and magnetic field theory and become proficient in the analysis of electromagnetic problems using classical principles.
- Understand the behavior of electrical circuits and become proficient in the analysis of electrical circuits using Ohm's law and Kirchhoff's laws.
- Understand physical and geometrical optical phenomena based on classical optical theory and become proficient in the analysis of optics problems using classical principles.
- Work as a team or group to experimentally verify relationships which were established theoretically in lecture.
- Practice experimental methods commonly used in science and observe experimentally the relationships between physical quantities that are allowed to vary and their effect on other physical quantities.
- Become familiar with specific techniques and pieces of equipment that may be essential for subsequent work and appreciate the limitations imposed on the conclusions derived from experimental results due to the precision of the equipment.
- Develop skills in keeping adequate and careful records and in the proper reporting of scientific research.

Course Outline

- Electric Charge and Electric Field
- Gauss's Law
- Electric Potential
- Capacitance and Dielectrics
- Current, Resistance, and Electromotive Force
- DC Circuits
- Magnetic Fields and Forces
- Electromagnetic Induction
- Alternating Current
- Electromagnetic Waves
- Optics

Laboratory Experiments

- Equipotential Surfaces
- Ohm's Law
- Kirchhoff's Laws
- RC Time Constants
- The Earth's Magnetic Field
- The Current Balance
- Reflection and Refraction
- Thin Lenses
- Interference and Diffraction

Method of Instruction

Class will consist primarily of presenting fundamental physics concepts, working problems, and discussing in-class demonstrations. Key points will be highlighted by the choice of examples, and these points will be discussed in the context of the example.

Grading

The final average will be computed as follows: 55% will be from lecture tests, 10% from homework, 20% from lab, and 15% from the final exam. Homework will be assigned for every major topic that is covered. Lab points will be determined based on lab report grades (see Lab Policies and Procedures handout for further details). The final exam will be comprehensive.

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 only under the following circumstances:

- Consent of the instructor has been obtained prior to the test.
- An excused absence is obtained from a doctor or the Vice-President for Academic Affairs

Required Text and Materials

University Physics with Modern Physics, *13th Edition*, by Young and Freedman. In addition to the text, you will need a scientific calculator and a laboratory data notebook. Procedures for individual lab experiments can be found online at http://www.mc.edu/academics/departments/physics/lab-information/. You are expected to have the laboratory procedures printed out and previewed before you come to lab. It may also be beneficial to bring a set of colored pencils to lecture and lab. Figures shown on the board are often drawn in multi-color for clarity, so it is recommended that the illustrations in your notes take advantage of this capability as well.

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 and participation is an essential part of a university education, and students are expected to attend and 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 and 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 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.

Tutoring

Physics tutoring is available multiple times a week. The tutoring schedule will be posted on the door of the classroom.