



PHYSICS II PHYC 202

Course Description

This course provides basic knowledge in biophysics. It enables the students to understand the concepts of human physiology. The course includes basic principles of electricity, electromagnetism, light and optics. Modern physics consists of quantum physics, relativity, atomic physics, nuclear physics and nuclear medicine. The course is designed to increase problem-solving and analytical thinking skills. Students perform experiments based on the principles of electricity, optics and atomic physics.

Credit: 3 credits

Repeatable: No

Course Structure

The course will be presented in different formats: Lectures, self-directed learning, discussions and student assignments etc.

Competencies

This course emphasizes competencies to enhance skills essential for a future health care professional.

- Knowledge
 - **Demonstrate content knowledge and skills in foundational courses required by biomedical professionals**
 - Demonstrate information literacy
 - **Demonstrate quantitative reasoning**
 - **Demonstrate longitudinal learning through coursework**
- Critical Thinking
 - **Develop the skills of self-reflection and peer assessment to improve personal performance.**
 - Demonstrate the ability to analyze literature and written material
 - Demonstrate the ability to distinguish between well-reasoned and poorly reasoned arguments
- Communication Skills
 - Demonstrate effective presentation skills to faculty and peers
 - **Demonstrate effective listening skills**
 - Demonstrate effective written communication

Objectives:

Upon completion of PHYC 202 course, the student should be able to describe and solve problems related to:

- Electric Charge and Electric Fields
- Electric Potential
- Capacitance
- Current and Resistance
- Electric Circuits (Capacitive and Resistive)
- Magnetic Fields Due to Currents
- Electromagnetic waves
- Interference of waves
- Diffraction of waves
- Photons and Matter Waves
- Nuclear Physics and Energy from the Nucleus
- Quarks, Leptons, and the Big Bang

Schedule: Dates and times to be posted at the beginning of the term on the online calendar.

Course Topics / Outline

Activity #	Lecture Topics
Week1	Electric charge, Conductors and Insulators, Coulomb's Law, Quantization and Conservation of Charge, Electric Field, Field lines, Field due to a point charge.
Week 2	A point charge in an Electric Field, Electric potential energy, Electric potential, Potential due to a point charge
Week 3	Capacitance, Capacitors in series, Capacitors in parallel
Week 4	Electric current, Resistance and Resistivity, Ohm's law, Resistances in series, Resistances in parallel
Week 5	The ammeter and the voltmeter, Multi-loop Circuits, Kirchhoff's Laws
Week 6	Magnetic Field and Magnetic field lines, Magnetic Materials, Magnetic force on a current-carrying wire, Magnetic fields due to current, Force between two parallel currents
Week 7	Mid-Term Examination
Week 8	Lenz's Law, Transformers, Electromagnetic induction
Week 9	Types of Waves, Characteristics of Waves, Wave equation, Interference of Waves
Week 10	Interference (Young's experiment), The Photon, The Photoelectric Effect
Week 11	The Bohr Model of the Hydrogen Atom, Some Properties of Atoms, Some Nuclear Properties and Terminology
Week 12	Radioactive Decay, Nuclear Fission, Thermonuclear Fusion
Week 13	Pre Examination Review
Week 14	End of Term Examination

Assignments:

Students are required to present three 4-pages description of the physics underlying each of the following: lasers, x-rays, ultra sounds and magnetic resonance imaging. The write up must also include the medical applications.

Textbooks and Reference Materials:**Required Texts**

Hugh D. Young, Philip W. Adams, Raymond Joseph Chastain. College Physics. 10th edition. Publisher: Pearson.

Recommended Texts

David Halliday, Robert Resnick, Jearl Walker. Fundamentals of Physics. 10th edition. Publisher: Wiley.

Evaluation: Students are evaluated by a midterm exam, a final exam, assignments and their attendance.

Points:

	Points*
Assignments	20%
Mid Term	30%
Final exam	40%
Attendance	10%
Total points	100%

*Points are approximate and may be adjusted during the term. Students will be notified of changes.

Grade:

Percent of Points	Letter Grade
95-100%	A(h)
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

Attendance:

Students are expected to attend at least 80% of all scheduled learning activities. Attendance in the class will be recorded. Students attended 80% or more will be awarded with 10% on total scoring system. Please note that absences due to illness or misadventure will be factored into the 20% of allowable absences if informed respective faculty or the Dean of Students.

Policies:Professional Demeanor

The student should be thoughtful and professional when interacting with faculty and other students. Inappropriate behavior includes the use of offensive language, gestures, or remarks with sexual overtones. Students should maintain a neat and clean appearance, and dress in attire that is generally accepted as professional.

Honesty

Students are expected to demonstrate honesty and integrity in all aspects of their education and in their interactions with faculty, administration, physicians, patients, and fellow students. They will not cheat, plagiarize, or assist others in the commission of these acts.

Faculty and Office Hours:

Mr. Marcus Caine, Instructor

Student may schedule an appointment by email.