19267-142(8) Physics for Health Sciences (2l, 1t)

2018

Course summary:

Structure of matter, kinematics, statics, dynamics, heat, temperature, wave motion and electricity.

Language policy:

Afrikaans and English in the same class groups:
During each lecture, all information is conveyed at least in English. Summaries and/or explanation of the core concepts will also be given in Afrikaans. Questions in Afrikaans and English will, at the least be answered in the language of the question. Students will be supported in Afrikaans and English during a combination of appropriate facilitated learning opportunities.

Module relevance in programme:

This module is a service module for physiotherapy and occupational therapy first year students. The course content exposes the students to concepts in statics (levers, equilibrium), dynamics (work-energy, momentum), waves (sound and light), charge, electrical current and magnetism. The module has a strong focus on conceptual understanding of these topics. An element of analytical problems solving is also introduced and strategies for problem solving are explored. It is hoped that the module will broaden the student perspective of science (Physics in particular), creating an awareness and appreciation of the subject matter which will lead to a rewarding experience for the students. Where possible, concepts are explained using examples from the medical fields. It is hoped that the understanding achieved, especially with regards to statics and analytical problem solving, will be applied by the students in their further years of study

Outcomes of course:

Emphasis is placed on mastering the physics concepts and how to use them to solve problems, rather than memorising recipes or formulas. The student should become familiar with the many principles in physics and learn their mathematical formulations. The student must be able to use these concepts to solve realistic problems and simultaneously develop the ability to work with physical quantities and their appropriate units.

Lecturer:

Dr PH Neethling
Telephone number: 021 808 3365
E-mail address: pietern@sun.ac.za
Office: Room 1042 in the Merensky Physics Building

Course content:

Splinting and Mechanics
Newton's Law, Static equilibrium, Vector analysis, Rotational inertia, Torque, Centre of gravity, Stability, Levers, Pressure

Mechanical energy, Work and Power
Work and Power, Kinetic and potential energy, Elasticity, Conservation of energy, Machines and efficiency

Momentum
Impulse and Momentum, Changes in Momentum, Conservation of Momentum, Collisions

Temperature and Heat
Heat, Specific heat capacity, Conduction, Convection and Radiation, Change of phase

Waves and Radiation
Properties of waves, Sound waves and ultrasound, Electromagnetic radiation, Effects of radiation on the body

Electro-stimulation
Charges and Coulomb's Law, Charge and discharge, Electrical field strength, Electrical potential, Capacitance, Electrical currents and circuts, Resistance and Ohm's Law

Practical (Tutorials):

Some of the lecture periods will be used for tutorials.

Study material:

The prescribed text book is a compilation from different text books and is available from the lecturer at about R150 (depending on student numbers).

Learning opportunities:

Interactive problem solving opportunities during lectures as well as regular tutorial sessions.

Assessment:

Methods of Assessments
Tutorial and homework assignments will contribute 30-50 % of the class mark. One class test will be written during the semester and will contribute 50-70 % to the class mark.

Venue and time of assessment opportunities
Class test:
Date: See timetable
Time: To be confirmed
Venue: Lecture hall Gamma (Room 2013), Merensky Building

Calculation of class mark:
Class mark = 30-50% (assignments) + 50-70% (class test)

Calculation of final mark for the module:
Final mark = 40% (class mark) + 60% (examination)

Admission to examination:

A class mark of at least 40% should be attained in order to qualify for the exam at the end of the year.