12998-176(32) Preparatory physics (3l, 3p)

2017

Course summary:

Students follow this module in the BSc Extended Degree Programmes in AgriSciences and Science and for the BEng. The module focus on the nature of physics with the following themes as content: Mechanics, electromagnetism, modern physics.

Method of assessment: Flexible assessment

Language policy:

Afrikaans or English in separate class groups (Parallel medium):
A class is divided into separate Afrikaans and English groups. Students provide their preferred language of teaching at registration. Additional learning opportunities involving students from both language groups will be used to promote integration.

Module relevance in programme:

The module prepares the student for physics 114 and 144 or physics 134 and 154

Outcomes of course:

This module focuses on facilitating a process where students need to make connections between the study material, events during contact sessions and tasks to give the students the opportunity to prove that they have the potential to continue with further studies and to teach the students something about the importance of such a process. The process involves a selection of certain physical concepts, their application to solve problems and the relevance of certain mathematical concepts for physics.

Lecturer:

Mr Dieter Geduld
Telephone number: (021) 808-3361 (Merensky building)
E-mail address: geduld@sun.ac.za
Office: Room 0056 in the Merensky Building

Course content:

Formal lectures
Topics covered during the lectures include the following:

Vectors: Cartesian coordinate system, resultant, component vectors, force, velocity and acceleration Linear motion, graphs for motion along a straight line, position versus time, velocity versus time.
Newton's laws; types of forces: forces exerted by ropes; gravitational force; normal force; friction
Momentum and energy.
Two dimensional projectile motion; work-energy theorem applied to a horizontal motion, circular motion.
Fluid Mechanics, Archimedes' principle.
Electric force; electric field; electric potential; electron volt
Magnetic field; magnetic force; electromagnetic induction
Temperature, heat and thermodynamics, heat transfer and phase changes
Atomic nucleus, radioactivity: alpha and beta decay; decay curve; half-life;

Laboratory work
The laboratory work consists of 4 experiments on topics related to the course material. Students work in groups dependent on equipment availability. Each student, however, has to record his/her own results and written reports on the experiments and are assessed individually.

Practical (Tutorials):

There are 20 tutorial sessions of 3 hours each. The tutorial sessions alternate with laboratory work. The problems for a tutorial will be available to the students on the Tuesday prior to the tutorial session. During the first two hours of the tutorial students will have the opportunity to ask questions. During the last hour a tutorial test will be written. These tests will include problems similar to problems in the present tutorial as well as a questions in which relevant concepts of the present tutorial need to be applied in a different way than in any of the tutorial problems. The marks for these tests will contribute to the final mark for the course. Final detailed solutions to the tutorial tests will be provided during the subsequent lecture period. No written solutions will be provided.

Study material:

Prescribed textbook: **"Conceptual Physics Fundamentals"**
(Pearson/Addison-Wesley) by Paul G. Hewitt.
Notes complementary to the text book and with references to the relevant pages in the text book will be made available to the students.

Learning opportunities:

1. Tutorials (20 tutorials of 3 hours each).
2. Feedback of tests and tutorial problems will be given during tutorials or lectures.
3. The lecturer will be available for students during certain scheduled periods to answer questions.

Assessment:

Methods of Assessments

Tutorial tests
Class tests
Practical laboratory reports

Venue and time of assessment opportunities

Tutorial tests: during the last hour of a tutorial session
Class tests: on dates as scheduled according to timetables, in venues which will be announced.

Calculation of class mark:

Not applicable

Calculation of final mark for the module:

Tutorial tests:	20%
Practical mark:	15%
Practical test:	5%
Class tests:	60%