

12998-146(16) Preparatory physics (3l, 3p)

2014

Course summary:

For BSc (Extended Degree Programme) students. The module focuses on the nature of physics with the following themes as content: Mechanics, electromagnetism, modern physics.

Flexible assessment

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: resultant; component vectors; velocity

Linear motion, graphs for a motion along a straight line: position versus time; velocity versus time

Newton's laws; torque, 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

Fluid Mechanics, Archimedes' principle

Electric force; electric field; electric potential; electron volt

Magnetic field; magnetic force; electromagnetic induction

Vibrations and waves, transverse and longitudinal waves, standing waves, Doppler effect

Photoelectric effect

Atomic nucleus, radioactivity: alpha and beta decay; decay curve; half-life;

Laboratory work

The laboratory work consists of 6 experiments on topics related to the course material. Students work in pairs. Each student, however, has to record his/her results and written reports on the experiments are assessed individually. At the end of the semester the students need to do a practical exam where experimental data will be given and students will need to apply methods which have been applied to several experiments which they have done earlier.

Practical (Tutorials):

There are 6 tutorial sessions of 3 hours each. The tutorial sessions alternate with laboratory work. The problems for a tutorial will be available to the students at least one week before the tutorial. Some of the problems will be given as homework during a lecture and the solutions to those problems will be given during the next lecture. Final answers to the rest of the tutorial problems and the answers to the previous tutorial test will be available to students at the beginning of a tutorial session. During the first two hours of the tutorial students will have the opportunity to ask questions. During the last hour a test will be written. These tests will include multiple choice questions, a problem similar to one of the problems in the present tutorial as well as a question 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.

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 (6 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

Practical exam

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 exam: 15%

Class test 1: 25%

Class test 2: 25%