

# 12998-176(32) Preparatory physics (3I, 3p)

2016

## 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.

*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](mailto:geduld@sun.ac.za)  
Office: Room 0056 in the Merensky Building

## Course content:

### Formal lectures

Topics covered during the lectures include the following:

- Equilibrium and linear motion, graphs for a 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 results and written reports on the experiments are assessed individually.

### Practical (Tutorials):

There are 15 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 Monday 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 a problem similar to one of the 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 solutions to the tutorial test will be given 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 (15 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%

Class tests: 65%