

12998 – 176 (32) Preparatory Physics (3L,3P)

2022

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.

Outcomes of course:

This module focuses on facilitating a process where students need to make connections between the study material, events during online 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 GL Andrews

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Office: Room 1015 in the Merensky Building

Course content:

Formal lectures (Online)

Topics covered during the lectures include the following:

- Unit conversions, Significant figures
- Vectors: Cartesian coordinate system, resultant; component vectors; force, displacement, velocity, acceleration.
- Linear motion, graphs for motion along a straight line: position versus time; velocity versus time; acceleration versus time.
- Two dimensional projectile motion
- Four fundamental forces, Macroscopic forces: forces exerted by ropes; gravitational force; normal force; friction.
- Newton's laws
- Impulse and Momentum
- Energy, Work-energy theorem
- Simple Harmonic Motion
- Fluid Mechanics
- Temperature, heat and thermodynamics, heat transfer and phase changes
- Electric force
- 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 individually and has to record his/her own results and submit written reports on the experiments individually. Iten reports on the experiments are assessed individually. It should be noted that the laboratory work will be offered face to face where possible.

Practical (Tutorials):

There are weekly online 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 tutorial students will have the opportunity to ask questions in the live chatrooms on SUNLearn. Students will also write tutorial tests. 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: There is no prescribed textbook for this module. Students will receive references to open source textbooks.

Learning opportunities:

1. Tutorials. (Online)
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 and assignments-

Venue and time of assessment opportunities

Tutorial tests: Will be announcing weekly.

Class tests: on dates as scheduled according to timetables, in venues which will be announced.

Calculation of class mark:

Calculation of final mark for the module:

Tutorial tests: 20%

Practical mark: 15%

Class tests: 65%