12998-114(16) Introductory Physics A (3l, 3p)

2018

Course summary:

A calculus-based introductory systematic treatment of Newton mechanics that serves as the foundation for more advanced physics modules and eventual specialisation in physics. Experimental measurement and expression of physical quantities, kinematics, dynamics of translation, work and energy, rotational motion, statics, conservation laws, heat and thermodynamics.

C Mathematics 114

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.

Interpreting services from English to Afrikaans

Module relevance in programme:

The role of this module is to guide the students in developing a basic understanding for a subset of physical phenomena and offers the first systematic approach to developing mathematical models of the natural world. It also offers a structured approach to problem identification and problem solving strategies which are not restricted to the course itself. In 2018 the module commences with an introduction to thermodynamics which are continued in Physics 314 and which is also applicable for Physical Chemistry 254. Next the basics of classical mechanics are covered which connect to Physics 224 and 254 where the former extends various concepts of classical mechanics and the latter serves as a basic introduction into quantum mechanics.The concepts within classical mechanics will also be beneficial to particular applied mathematics modules.

Outcomes of course:

The aim of the module is to lay the foundation for more advanced courses in physics and eventual specialization in physics. This calculus-based course serves as an introductory systematic treatment of Newtonian mechanics and aspects of thermodynamics. Students shall understand both the conceptual framework and be able to apply the calculus-based formalism to various physical situations.

Lecturer:

Prof KK Muller-Nedebock (Course coordinator)
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E-mail address: kkmn@sun.ac.za
Office: Room 1027 in the Merensky Building

Dr CM Steenkamp
Telephone number: (021) 808-3374 / 91
E-mail address: cmsteen@sun.ac.za
Office: Room 1044 in the Merensky Building

Dr G Bosman

Telephone number: (021) 808-5252 / 91
E-mail address: gwb@sun.ac.za
Office: Room 0056 in the Merensky Building

Mentor:

The Department of Physics has appointed a staff member as mentor for each year of its physics programme to be available to students for consultation. Students should feel free to discuss general issues related to the physics programme or specific modules in the programme with the relevant mentor, in addition to usual consultations with their individual lecturers of modules.

The mentor for first year programme and its modules is Dr GW Bosman
Telephone number: (021) 808-2525
E-mail address: gwb@sun.ac.za
Office: Room number 1028 in the Merensky Physics Building

Course content:

Formal lectures
Topics covered during the lectures include: Physical quantities, translational kinematics and dynamics, work and energy, mechanical conservation laws, heat and temperature, heat transfer, kinetic theory of gases.

Laboratory work
The laboratory work consists of 3 experiments on topics related to the course material. Students work in pairs. Each student will be expected to record his/her own data and provide a written report at the end of each of the experiments. These reports will be handed in at the end of each practical and accessed individually. At the end of the semester each student completes an individual examination on the laboratory work covered during the semester.

Practical (Tutorials):

Tutorials will occur each week. On days where practical laboratory work is also scheduled, the session will commence with a tutorial of one hour to be followed by the practical until 17:00. During tutorial sessions in which there is no scheduled practical the tutorial shall end at 17:00. There will be 6 practical sessions for laboratory work. During the tutorial sessions students have the opportunity to solve problems related to the course work and to participate in other activities to enhance their understanding of the content covered during the lectures. During each tutorial session students should expect to produce work that will contribute to their class mark. The nature of assignments and assessments will be varied.

Study material:

Prescribed textbook: **"University Physics"**
(Pearson/Addison-Wesley, 14th edition) by Young and Freedman.

Learning opportunities:

1. Tutorials (weekly, either 1 hour or 3 hours in duration).
2. A selection of lecture material available on SUNLearn (formats will be varied)
3. Solutions to selected problems available on SUNLearn.
4. Practicals
5. ePhys exercises on selected topics (SUNLearn)

Assessment:

Methods of Assessments
Tutorial problems, tutorial tests, homework assignments, group work, in-class quizzes
Class test

Practical laboratory reports

Examination
Venue and time of assessment opportunities
Tutorial tests: during a tutorial session
Early assessment opportunity: Click on the timetables link in the toolbar at the top of the page---Please important note below
Class test: Click on the timetables link in the toolbar at the top of the page
Exam: Click on the timetables link in the toolbar at the top of the page
Supplementary exam: Click on the timetables link in the toolbar at the top of the page
Calculation of class mark:
Tutorials, homework, other assignments and practical report mark: 50% (laboratory work and the other
assessments will be weighted roughly evenly)
Class test: 50%
Calculation of final mark for the module:
Examination mark: 60%
Class mark: 40%
Admission to examination:
A class mark of at least 40% should be attained in order to qualify for the exam.

Important note on early assessment:

The Department of Physics reserves the right to deregister students who fail to participate in the early assessment. Please see Section 20 on p. 117 of the Calendar Part 1, General, Policies and Rules, which includes: "If a student does not write the first formal assessment test in a specific module or makes the necessary arrangements to write such test later, the student's registration for the module will be cancelled by the faculty administrator concerned, on the recommendation of the department concerned. This entails that the module concerned will be removed from the student's student record and that the student will be informed by e-mail only of the deregistration."