

# 12998 - 144 (16) Introductory Physics B (3L, 3P)

2022

## Course summary:

An introductory physics module with a mathematical approach and emphasis on the fundamental concepts, with contents: Electrostatics, electrodynamics and magnetism. Special relativity.

*Prerequisite modules:*

- *Physics 114*
- *Mathematics 114*

*Co-requisite module: Mathematics 144*

## 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.

## 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. The module introduces the key basic concepts in electrostatics, electrodynamics and magnetism which are revisited and extended in Electrodynamics 254. The module concludes with a basic treatment of special relativity which lays the foundation for Special Relativity 342.

## Outcomes of course:

This calculus-based course exposes the student to a first systematic treatment of electricity and magnetism. It also lays the foundation for more advanced physics courses which may lead to eventual specialization in physics.

## Lecturers:

### **Dr GW Bosman (Course and practical coordinator)**

Telephone number: (021) 808 2525

E-mail address: [gwb@sun.ac.za](mailto:gwb@sun.ac.za) (preferred method of communication)

Office: Room number 1046 in the Merensky Physics Building

### **Dr JN Kriel**

Telephone number: (021) 808 3658

E-mail address: [hkriel@sun.ac.za](mailto:hkriel@sun.ac.za) (preferred method of communication)

Office: Room number 1014 in the Merensky Physics 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 the first year programme is **Dr JJ van Zyl** [jjvz@sun.ac.za](mailto:jjvz@sun.ac.za)

## Course content:

### **Lectures**

The following topics are covered during formal lectures: Electricity and magnetism: Electrostatics, electric fields and Gauss' law, potential, capacitance, currents and resistance, electrical circuits. Magnetic fields, force on moving charges in magnetic field, sources of magnetic fields. Brief introduction to electromagnetic induction and special relativity.

### **Practicals**

The practical component of the course consists of experimental work related to the course material. This mark counts towards the class mark.

## Tutorials:

Tutorials will occur each week. 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. See description of format under "Learning opportunities".

## Study material:

Prescribed textbook: "University Physics" (Pearson/Addison-Wesley) by Young and Freedman. Any edition of the book can be used.

We also recommend the use of the LibreTexts free online book, University Physics parts I and II. The link is available on SUNLearn.

Other study material may be made available on SUNLearn.

## Learning opportunities:

Lectures will take place **synchronously** in face-to-face sessions. No recordings of lectures will be made available afterwards.

Tutorials will be a compulsory **synchronous activity**. Should COVID restrictions allow, these may take place only in face-to-face sessions. Arrangements will be announced on SunLearn. Most tutorials will involve some type of submission for marks.

Practicals will be a compulsory **synchronous activity**. Should COVID restrictions allow, these may take place only in face-to-face sessions. Arrangements will be announced on SunLearn.

Online quizzes and ePhys quizzes.

## **Assessment:**

### **Methods of Assessments**

Tutorial problems and tests, homework assignments, and quizzes, potentially including ePhys quizzes.

Tests and examinations

Practical reports

### **Venue and time of assessment opportunities**

Quizzes: See timetable.

Tutorial problems and tests: See timetable.

Class test: See timetable

Exams: See timetable.

**Availability of marks:** Most marks will be available within two weeks after submission. The moderation processes for tests and exams may require more time.

**Note:** *The assessment model described below assumes that in-person, invigilated tests and exams will take place in the second semester. If COVID regulations prohibit this, the assessment model could be modified for online assessment. This may affect how the final mark is calculated.*

**Note:** *Physics 144 is an exam module. Make sure that you are familiar with how the exam system works. This is detailed in section 8.3 of the General Yearbook. Your mark is therefore not calculated using the A1, A2, A3 system employed by some flexible assessment modules.*

### **Calculation of class mark**

Tutorials, homework, various types of quizzes, and other assignments and practical report mark: 50%

Class test: 50%

### **Calculation of final mark**

Examination: 60%

Class mark: 40%

### **Admission to examination**

Class mark greater than or equal to 40%

### **Notice of deregistration**

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.