

59420-113 (8) Engineering Physics (2I, 0.5P, 0.5T)

2016

Course summary:

Introduction to physics and physical quantities, including: macro- and micro-descriptions of nature; molecular and atomic structure of materials: crystalline and amorphous solids; crystal structures, defects and applications; oscillatory motion, introduction to wave motion, superposition and standing waves, sound waves, Doppler effect; wave optics (diffraction, interference, polarization); introduction to nuclear physics. Flexible Assessment is implemented for this course.

Outcomes of course:

The aim of the module is to familiarize the students with a number of fundamental concepts in Physics, applicable to the field of engineering, and to instill an appreciation for Physics based problem solving. Topics covered were chosen to complement the rest of the curriculum the student will be exposed. By the end of the course the student should be familiar with a number of physical concepts as well as analytical problem solving techniques related to physical problems.

Lecturer:

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Mentor:

For each year of our physics programme the Department of Physics has appointed a staff member as mentor to be available to students. You are always invited to discuss general issues in the physics programme or its modules with this mentor, in addition to usual consultations with your individual lecturers.

For this module your mentor is Dr GW Bosman gwb@sun.ac.za

Course content:

Formal lectures:

Topics covered during the lectures include: Oscillations and waves, with emphasis placed on simple harmonic motion. Superposition of waves, standing waves, sound and the Doppler-effect. Light waves and wave optics, with emphasis on diffraction, interference and polarization. The macroscopic and microscopic (molecular and atomic) description of matter (crystalline and amorphous matter). Crystalline structures and defects. Introduction to nuclear physics, nuclear radiation, activity and life times.

Laboratory work:

The laboratory work consists of 3 experiments on topics related to the course material. Students work in pairs (or 3's if there is not enough equipment). 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 a week after each assessed individually. The precise format of the reports will be communicated to the students clearly at the beginning of the experiment.

Practical (Tutorials):

Tutorials will occur each other 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. 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: "Engineering Physics: Engineering Physics 113 and Engineering Physics 152" (Wiley Custom).

Learning opportunities:

Interactive problem solving opportunities during lectures as well as regular tutorial sessions.

Assessment:

Methods of Assessments

Tutorial assignments will contribute 8% of the final mark. Practical reports will contribute 12%. Assessment 1 (during test week) will contribute 30% and assessment 2, 50%.

Venue and time of assessment opportunities

Assessment 1:

Date: March 18

Time: 11:00

Venue: To be confirmed

Calculation of class mark:

Semester mark = 50% = 8% tutorial tests + 12% practical reports + 30% assessment 1

Calculation of final mark for the module:

Final mark = Semester mark + Assessment 2 mark 50%

Admission to examination:

All students that have successfully completed all 3 practical reports will be admitted to assessment 2 .