

# 12998-384(16) Experimental work in Physics (3l, 3p)

2015

## Course summary:

(This module cannot be taken simultaneously with Chemistry 2.)

Practical laboratory work in Physics. Selected experiments in modern Physics, which are related to the experimental research in the Department, are carried out introducing the student to experimental design and analysis of data.

*Continuous assessment*  
*C Physics 342, 352*

## Outcomes of course:

The student should be able to perform simple experiments of even so far unknown phenomena with a degree of independence, using a variety of techniques for measurement and data analysis. This includes:

- Understanding of the problem. Study of underlying theory.
- Planning of experiment and setup of instrumentation.
- Carry out measurements systematically, record data.
- Data evaluation, possibly modelling, presentation.
- Interpretation of results in terms of the original problem.
- Presentation of results: written report and oral presentation.

Important Objectives

- Experiments should be fun!
- Experiments are related to real research projects carried out at Department.

## Lecturer:

### Laser

**Dr PH Neethling (module coordinator)**

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### Nuclear

Dr JJ van Zyl, (021) 808-3384, [jivz@sun.ac.za](mailto:jivz@sun.ac.za)

Prof. P Papka, (021) 808 3368, [papka@sun.ac.za](mailto:papka@sun.ac.za)

## Course content:

The experiments on the following topics will be carried out:

From the field of optics, lasers and spectroscopy

- Interference
- Spectral transitions in Atoms
- Laser spectroscopy
- The Nitrogen laser
- The CO<sub>2</sub> and CO<sub>2</sub> TEA lasers
- The HeNe laser
- Transmission lines

From the field of nuclear physics:

- Nuclear physics laboratory equipment
- Beta particle attenuation
- Charged particle interaction
- Radioactivity
- Gamma ray detectors
- Alpha particle spectroscopy

### **Practical (Tutorials):**

All contact time is used as practical sessions in the laboratory. The lecturer is present in the laboratory to give guidance. One session is used to do a lab tour of the physics research laboratories.

### **Study material:**

Notes including references are provided for each experiment. Referenced books are available in the Physics library.

### **Learning opportunities:**

Laboratory work, lab reports and presentations.

### **Assessment:**

#### ***Methods of Assessments***

Continuous evaluation of written lab reports.

Two 10 minute oral presentations, at end of first and second semesters respectively.

Two theory tests, at end of first and second semesters respectively.

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

All assessments are done during the scheduled contact time (see ***timetable*** on Physics home page).

#### ***Availability of marks:***

As discussed with students.

#### ***Calculation of final mark for the module:***

The weights of the different marks will be communicated to students at the beginning of the academic year.