

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

2017

## 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.

*Method of assessment: Flexible assessment*

*Co-requisite modules: Physics 342, 352 or 372*

## 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:

Physics 384 is an exit module for the BSc Laser Physics programme. The module consists only of practical sessions. It requires the student to perform a wide range of experiments in the field of laser physics and nuclear physics. A focus is placed on independent experimentation, including experiment planning and design. The students will be required to write scientific reports and present oral accounts of experimental procedure and results. These skills are essential for post graduate studies and this module attempts to address this need. The topics of the experiments vary from year to year, but are always closely aligned with the research topics in the Physics department. The provides the students with some insight into the local research environment.

## 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)**

Telephone: (021) 808 3365, E-mail: [pietern@sun.ac.za](mailto:pietern@sun.ac.za)

Office: Room 1042, Merensky Building

Prof EG Rohwer (021) 808-3372, [egr@sun.ac.za](mailto:egr@sun.ac.za)  
Dr CM Steenkamp (021) 808-3374, [cmsteen@sun.ac.za](mailto:cmsteen@sun.ac.za)  
Dr GW Bosman (021) 808 2525, [gwb@sun.ac.za](mailto:gwb@sun.ac.za)  
Dr PH Neethling (021) 808-3365, [pietern@sun.ac.za](mailto:pietern@sun.ac.za)  
Dr H Uys (021) 808 3371, [hermann@sun.ac.za](mailto:hermann@sun.ac.za)

#### **Nuclear**

Dr JJ van Zyl (021) 808-3384, [jjvz@sun.ac.za](mailto:jjvz@sun.ac.za)  
Prof. P Papka (021) 808 3368, [papka@sun.ac.za](mailto:papka@sun.ac.za)

#### **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 second year programme and its modules is Dr CM Steenkamp [cmsteen@sun.ac.za](mailto:cmsteen@sun.ac.za)

#### **Course content:**

A selection of experiments dealing with Lasers, spectroscopy, quantum optics and nuclear physics will be carried out independently by the students. The details of the experiments along with the time table will be communicated to the students at the start of the year.

#### **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.