

PHYS285: Technical and Professional Skills for Physicists

Course Description

PHYS285 is a laboratory based course in experimental techniques, data acquisition and analysis for second-year physical science students.

Teaching staff

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Usually two of us will be present in the lab. Our job is to guide you through the experimental work and analysis so don't hesitate to talk with us anytime.

Pre-requisites

(1) PHYS101; (2) MATH102 or EMTH118

(3) COSC131 or COSC121 or other approved python programming background.

These prerequisites may be replaced by a high level of achievement in level 3 NCEA Physics and Mathematics with Calculus or other background approved by the Head of Department.

Timetable

This year there are two lab streams.

Most weeks we will be operating from our lab, Ernest Rutherford 313, with one stream on Monday and Tuesday, and the other stream on Wednesday and Thursday.

In Weeks 1 and 3 we have computer lab sessions held jointly for both streams.

In Week 6, we will focus on report production skills (scientific writing and making great figures).

Assessment

20% Preparation and attendance.

Each week you are expected to attend all timetabled activities. (We can give exemptions for clashes.) For the regular 3-hour labs in Term 2, you must:

- (a) arrive at the lab at the start time on both days and actively participate in the experiment; and
- (b) at the start of the first day, show your lab book or tablet where you have done the preparation for your experiment.

If you fulfil these criteria you will receive 2 marks. One mark will be deducted if you are late, don't have your lab book, or haven't done the preparation.

A minimum mark of 15% out of 20% for this part of the assessment is required in order to pass the course. The expectation is that most students will obtain 2 marks each week.

40% Jupyter notebooks showing experimental analysis and results.

For each regular lab experiment and for the computer lab in Week 3, you will need to submit a jupyter notebook file and supporting data files (if needed).

For the labs, each group submits one notebook, and group members receive the same mark. The notebook files must be well documented, and contain all the analysis code needed to reproduce your experimental results.

Submissions are due at the start time of the following week's first lab session.

Notebooks will be marked out of 10, following a scheme that will be published.

40% 3 formal reports, worth 11%, 13.3%, 15.7% respectively.

You will be required to write formal lab reports for 3 of your experiments.

These will be due on particular dates to be advised.

Marks and Grades: The following numbers should be considered as a guide to the expected grades under normal circumstances. The School reserves the right to adjust mark/grade conversions, if necessary.

Please note that for all invigilated assessments (tests and exams) worth 33% and above, failure to obtain a mark of at least 40% will result in a final grade no higher than an R at 100 and 200 level, and a C- at 300 level.

Grade:	A+	A	A-	B+	B	B-	C+	C	C-	D	E
Minimum mark %:	90	85	80	75	70	65	60	55	50	40	0

Lab book

During the first week of term you will need to acquire a hardcover laboratory notebook, which are sold from the University Bookshop at a cost of about \$15. Your lab book will need to be with you at all times in the lab. These are the same as what you would have used for PHYS101/102 last year, and it is fine to keep using those books if you still have space in them.

A second allowable option is to have a tablet (ipad or similar) to use for the same purpose.

You will use your lab book or tablet to document all your experimental work, and write your lab preparation. This will be your main source of information when you come to write your formal reports.

Absences

You should assume that you are required to attend all sessions necessary to obtain your experimental data. (This will generally not take 6 hours.) In cases of illness or other good reasons that you might have to miss a lab, you will need to send Michael an email detailing the circumstances and requesting an exemption. I will expect you to make best efforts to catch up on missed material when it is feasible to do so.

Health and Safety

For your health and safety, there are several rules that apply when you are in the lab:

1. Do not attend the lab if you are unwell. (See absences above.)
2. You are not permitted to consume food or drink in the lab. An exception is that you are allowed to have a water bottle.
3. Footwear must be worn in the lab, and open-toed shoes (sandals, jandals etc) are not allowed.
4. If you discover any electrical or other hazard, do not use the equipment. Report the problem to one of the lab supervisors immediately.