

PHYS/ASTR 381 Advanced Experiments in Physics/Astronomy

Course Coordinator/Lecturer/Laboratory Supervisor:

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Introduction

Welcome to the PHYS/ASTR 381 course in advanced experimental physics and astronomy. These co-coded courses are both 15-points and run concurrently in the second semester. Those wishing to include more than 15 pts of course work are encouraged to consider PHYS/ASTR 391, which are further individual research projects supervised by a staff member (you are encouraged to go and talk to any staff if you are interested in undertaking a project in their research area).

The emphasis in this course is on skills that are useful in further study/research and are also industry relevant. Specifically, you will gain experience in:

1. using computers for instrument control and data acquisition;
2. using the Python programming language to complete advanced data analysis;
3. producing a formal written report on a research project; and
4. completing oral presentations in a variety of situations,

You will also develop a deeper understanding of the differences and similarities between Mātauranga Māori and Western Science, enhancing your bicultural competence.

Assessment summary

The course is marked out of 100. Since it is a 15 point course the nominal workload is approximately 150 hours over the semester, i.e. 12.5 hours per week. The assessment is distributed as follows:

Practice Oral Presentation	10 %
Introduction to Data Analysis using Python 1	7.5 %
Introduction to Data Analysis using Python 2	7.5 %
LabVIEW-base data acquisition	7.5 %
Data acquisition and Instrumental Control using Python	7.5%
Mātauranga Māori	15 %
Project report	35 %
Project Presentation	10 %

Practice Oral Presentation: Week 3 and Week 4

10% Oral presentation: This assessment item focusses on developing oral presentation skills. Each student will complete a 5 minute oral presentation detailing a popular science subject or discussing the limitations of a pseudo-scientific concept. These presentations will occur in Week 3 and 4. These presentations are marked via student peer assessment, but guided by a marking rubric available on LEARN.

Python Data Analysis Laboratories: Week 3 and Week 6

7.5 % Introduction to Data Analysis using Python 1	Submission deadline 2 nd August
7.5 % Introduction to Data Analysis using Python 2	Submission deadline 23 rd August

Note that both data analysis labs will be marked in real-time in class. However, marks will be provisional until you have submitted your python code via the LEARN page and it has passed through plagiarism scanning software.

Data acquisitions Laboratories:

7.5 % LabVIEW-based data acquisition	Submission deadline 20 th September
7.5% Python Data acquisition and Instrumental Control	Submission deadline 20 th September

These laboratories will provide you with experience of using a graphical programming language (LabVIEW) to interact with data acquisition hardware and also you to develop the ability to interact with scientific instruments using Python.

The Labview and Python code you create in class needs to be submitted by the end of Week 8 (20th September). Note that both data acquisition labs will be marked in real-time in class. However, marks will be provisional until you have submitted your code via the LEARN page and it has passed through plagiarism scanning software.

Mātauranga Māori:

As part of developing your bicultural competence:

- You will complete a session where you will be guided by the Faculty of Science Kaiārahi to develop or further develop your mihimihi. This will include a period to practice your mihimihi in front of your classmates. You will also be expected to complete your mihimihi as part of oral presentation assessments.
- You will also be given the opportunity to review documents created by Māori scholars which will allow you to gain a deeper understanding of some element of Mātauranga Māori and/or its relationship to Western Science

Project

A 6 week research project. Projects will be available for selection in Week 4 of semester and start in Week 5. The report for this project is due to be handed in by 5:00 pm Friday 11th October. The assessment breakdown for this project is:

35 % A 15 page report in the style of a scientific paper, which will be marked by both your academic supervisor and another academic from the School of Physical and Chemical Sciences.

10% An oral presentation on your research project (Time/Date in Week 11 and 12 TBD)

ASTR381/PHYS381 Schedule

Term 3		
Week	Session Type/ Location/ Day-Time	Content
Week 1 (week starting Monday 15 th July)	Lecture / Jack Erskine 443/ Monday 1400-1700 Computer Laboratory/ Ernest Rutherford 464 / Wednesday 0900-1100	Course Introduction Report Writing Skills Presentation Skills Data Analysis Lab 1
Week 2 (week starting Monday 22 nd July)	Lecture /Jack Erskine 443/ Monday 1500-1700 Computer Laboratory/ Ernest Rutherford 464 / Wednesday 0900-1100	Building Bicultural Competence Data Analysis Lab 1 SUBMISSION ORAL PRESENTATION POWERPOINT
Week 3 (week starting Monday 29 th July)	Lecture / Jack Erskine 443/ Monday 1400-1700 Computer Laboratory/ Ernest Rutherford 464 / Wednesday 0900-1100	Student Oral Presentation Drop-in support for Data Analysis Lab 1 (OPTIONAL IF YOU NEED EXTRA TIME ON THIS EFFORT) SUBMISSION DATA ANALYSIS LAB 1
Week 4 (week starting Monday 5 th August)	Lecture / Jack Erskine 443/ Monday 1400-1700 Computer Laboratory/ Ernest Rutherford 464 / Wednesday 0900-1100	Student Oral Presentations/ Project presentations from Supervisors TBD Data Analysis Lab 2 SUBMISSION MĀTAURANGA MĀORI ASSESSMENT
Week 5 (week starting Monday 12 th August)	Laboratory/ Ernest Rutherford 313/ Monday 1400-1700	Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition

	Computer Laboratory/ Ernest Rutherford 446/ Wednesday 0900-1100	Data Analysis Lab 2
Week 6 (week starting Monday 19 th August)	Laboratory/ Ernest Rutherford 313/ Monday 1400-1700 Computer Laboratory/ Ernest Rutherford 313/ Friday 0900-1200	Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition Drop-in support for Data Analysis Lab 2 (OPTIONAL IF YOU NEED EXTRA TIME ON THIS EFFORT) SUBMISSION DATA ANALYSIS LAB 2
Term Break (25th August to 10th September)		
Term 4		
Week	Session Type/ Location/ Day-Time	Content
Week 7 (week starting Monday 9 th September)	Drop-in class/ Ernest Rutherford 313/ Monday 1400-1700	Drop in support for Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition
Week 8 (week starting Monday 16 th September)	Drop-in class/ Ernest Rutherford 313/ Monday 1400-1700 Drop-in class/ Ernest Rutherford 313/ Friday 0900-1200	Drop in support for Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition Drop-in support/ Laboratory access period
Week 9 (week starting Monday 23 rd September)	Drop-in class/ Ernest Rutherford 313/ Tuesday 0900-1200 Drop-in class/ Ernest Rutherford 313/ Friday 0900-1200	Drop-in support/ Laboratory access period Drop-in support/ Laboratory access period
Week 10 (week starting Monday 30 th September)	Drop-in class/ Ernest Rutherford 313/ Tuesday 0900-1200 Drop-in class/ Ernest Rutherford 313/ Friday 0900-1200	Drop-in support/ Laboratory access period Drop-in support// Laboratory access period
Week 11 (week starting Monday 7 th October)	Lecture / TBD/ Monday 1500-1800	Project Presentations

Week 12 (week starting Monday 14th October)	Lecture / TBD/ Monday 1500-1800	Project Presentations
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Herenga Akoranga | Academic Policies (e.g. special consideration, dishonest practice):

The School of Physical and Chemical Sciences has general policies that apply to all courses regarding such matters as Dishonest Practice, Allowed types of calculators, Marks and Grades boundaries, Late Work, Academic Liaison, Assistance for Students with Disabilities, Reconsideration of Grades, Aegrotat Applications, Missing of Tests etc. Please consult the School website for details.