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. Both of these courses are 15-points running concurrently for the second semester. Those wishing to include more than 15 pts of *experimental* physics in their courses 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).

A familiarity with some principles and practical aspects of experimental physics is of fundamental importance and frequently of considerable value to employers. The analysis and interpretation of observations also develop complementary skills, such as scientific programming which are sought after by employers.

This emphasis in this course is on skills that you will need for experimental research in both industry and academia. Specifically:

1. Use of computers for experimental control and data acquisition.
2. A high level of computer-aided data analysis.
3. Practise in producing written reports of your work.
4. Developing oral presentation skills.
5. Developing a deeper understanding of differences and similarities between Mātauranga Māori and Western Science
6. Science Communication to varied audiences

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:

7.5 % Introduction to Data Analysis using Python 1
7.5 % Introduction to Data Analysis using Python 2

Note that both data analysis labs will be marked in real-time in class where possible. However, marks will be provisional until you have submitted your python code and it has passed through plagiarism scanning software analysis. Material not completed in class can also be submitted vie the LEARN page until 11th August

7.5 % LabVIEW-based data acquisition
7.5% Data acquisition and Instrumental Control using Python

Note that both data acquisition labs will be marked in real-time in class where possible. However, marks will be provisional until you have submitted your code and it has passed through plagiarism scanning software analysis. Material not completed in class can also be submitted vie the LEARN page until 25th August

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 4 in Lecture Theatre A9. These presentations are marked via student peer assessment, but guided by a marking rubric available on LEARN.

45% 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 6th 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 TBD)

15 % Science communication / Western Science and Mātauranga Māori assessment

You will be provided with a list of projects to choose from during week 4 of term 3.

ASTR381/PHYS381 Schedule

Term 3		
Week	Session Type/ Location/ Day-Time	Content
Week 1 (week starting Monday 17th July)	Lecture / A9 Lecture Theatre/ Monday 1500-1800 Computer Lab/ ER212 Computer Lab / Tuesday ER212 0900-1200	Course Introduction Report Writing Skills Presentation Skills Introduction to Data Analysis Lab 1
Week 2 (week starting Monday 24th July)	Computer Lab / ER212 Computer Lab/ Tuesday 0900-1200 Computer Lab/ Jack Erksine 248 / Friday 0900-1200	Introduction to Data Analysis Lab 1 OR Introduction to Data Analysis Lab 2 Introduction to Data Analysis Lab 1 OR Introduction to Data Analysis Lab 2
Week 3 (week starting Monday 31st July)	Laboratory/ Ernest Rutherford 313/ Tuesday 0900-1200 Laboratory/ Ernest Rutherford 313/ Friday 0900-1200	Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition
Week 4 (week starting Monday 7th August)	Oral Presentations/ A9 Lecture Theatre/ Monday 1500-1800 Laboratory/ Ernest Rutherford 313/ Tuesday 0900-1200	Oral Presentations Introduction to LabVIEW OR Introduction to Python instrument control and data acquisition
Week 5 (week starting Monday 14th August)	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 6 (week starting Monday 21st August)	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

Term Break (25th August to 10th September)		
Term 4		
Week	Session Type/ Location/ Day-Time	Content
Week 7 (week starting Monday 11th 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 8 (week starting Monday 18th 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 9 (week starting Monday 25th 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 2nd October)	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 9th October)	**Lecture / A9 Lecture Theatre/ Monday 1500-1800**	Science Communication/ Western Science and Mātauranga Māori
Week 12 (week starting Monday 16th October)	**Lecture / A9 Lecture Theatre/ Monday 1500-1800**	Science Communication/ Western Science and Mātauranga Māori

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.