



ASTR2020

Observational Astronomy

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Mathematical and Physical Sciences

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General Information

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Credit points

10

Prerequisites

PHYS201 or PHYS2010

Corequisites

Co-badged status

Unit description

Following an introduction to some of the key objects in the sky, this unit is based around a major experimental project in observational astronomy. Lectures, labs and workshops in the first half of the unit provide students with the tools needed to design and execute an open-ended observational project in the 2nd half. Topics on observational astronomy (e.g. galaxies, stars, exoplanets) are covered alongside data and instrumentation requirements. Hands-on lab and project work provide a foundation in optical and radio telescope design and instrumentation. Python programming for image processing and analysis of large datasets are introduced and developed in the labs and major project. Modern project management tools and best-practice in experimental design are incorporated into the unit.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are

available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: design experiments suitable for gaining new knowledge about physical phenomena.

ULO2: demonstrate an understanding of a range of instrumentation topics and apply a subset of that knowledge to project work.

ULO3: work effectively in small teams and jointly manage a project.

ULO4: describe and discuss a range of topics in observational astronomy.

ULO5: Apply python computer programming and industry-standard software tools to real-world situations.

General Assessment Information

This unit has hurdle requirements, specifying a minimum standard that must be attained in aspects of the unit. To pass this unit you must obtain a mark of at least:

- 50% in the unit overall

as well as:

- 40% in the midsession examination

Students getting between 30% and 39% in the midsession exam will be given a second chance to meet the 40% hurdle pass mark.

Late Assessments Policy

The non-examination assessment components should be submitted by the due date and time.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern. For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for [Special Consideration](#).

Students anticipating or experiencing difficulties in meeting a deadline should discuss this with one of the lecturers in the first instance, ideally ahead of the deadline, if at all possible. Students should also be familiar with the University's Disruptions to Study policy (http://www.mq.edu.au/policy/docs/disruption_studies/policy.html).

Assessment Tasks

Name	Weighting	Hurdle	Due
Lab reports	20%	No	Week 5
Midession exam	20%	Yes	Week 7
Project report	60%	No	Milestones during semester, Final Report due in Exam Period

Lab reports

Assessment Type ¹: Lab report

Indicative Time on Task ²: 20 hours

Due: **Week 5**

Weighting: **20%**

Reports from laboratory experiments in the first half of the session.

On successful completion you will be able to:

- design experiments suitable for gaining new knowledge about physical phenomena.
- demonstrate an understanding of a range of instrumentation topics and apply a subset of that knowledge to project work.
- work effectively in small teams and jointly manage a project.
- describe and discuss a range of topics in observational astronomy.
- Apply python computer programming and industry-standard software tools to real-world situations.

Midession exam

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **Week 7**

Weighting: **20%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Exam on the lecture content from the first half of the unit.

On successful completion you will be able to:

- design experiments suitable for gaining new knowledge about physical phenomena.
- demonstrate an understanding of a range of instrumentation topics and apply a subset of that knowledge to project work.
- describe and discuss a range of topics in observational astronomy.

Project report

Assessment Type ¹: Report

Indicative Time on Task ²: 24 hours

Due: **Milestones during semester, Final Report due in Exam Period**

Weighting: **60%**

Report on your major project, covering its planning, execution and results.

On successful completion you will be able to:

- design experiments suitable for gaining new knowledge about physical phenomena.
- demonstrate an understanding of a range of instrumentation topics and apply a subset of that knowledge to project work.
- work effectively in small teams and jointly manage a project.
- describe and discuss a range of topics in observational astronomy.
- Apply python computer programming and industry-standard software tools to real-world situations.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Major Project

This is an observational astronomy project, in which students plan observations, collect and

process data, and extract results, which they will then write up in a Project Report.

Lectures

The Lectures will cover a broad range of topics in astronomy and astrophysics; the midsemester exam will be based on material from the lectures.

Note that the Lectures will be held **in-person**, on campus, as well as live-streamed and recorded on Echo360.

Workshops / Tutorials

Workshops in the first half will be a venue for further discussion of the lecture topics as well as reviewing examples of the types of questions that will be covered in the midsemester exam.

Workshops in the second half will cover tools and methods to support the Major Project work. Most of the Workshops will be interactive sessions with the tools introduced.

Note that Workshops will be held **in-person**, on campus.

Labs

The Labs provide hands-on python programming and experience working with astronomy data. The Labs provide an important way to learn required skills and develop familiarity with essential tools in preparation for the Major Project.

Note that the Labs will be held **in-person**, on campus.

Python programming resources

The Labs and Major Project require the use of the Python programming language. There are significant resources online about how to program with Python and specific tools for writing astronomy code:

- <http://learn.astropy.org/>
- <https://www.datacamp.com/community/tutorials/python-numpy-tutorial>
- <https://www.scipy.org/getting-started.html>
- <https://www.codecademy.com/learn/learn-python-3>

Software tools

Students will have the opportunity to select and use various software tools to help manage their Major Project work. Some examples will include:

- Communications & Project management
 - <https://slack.com/>
 - <https://trello.com/>
 - <https://zoom.us/>
 - <https://www.facebook.com/groups/>

- Coding
 - <https://github.com/>
 - <https://datastudio.google.com/>
- File and document sharing
 - <https://drive.google.com/>
 - <https://www.office.com/>
 - <https://www.overleaf.com/>

Unit Schedule

Week	Theme	Special note
	Observational basics	Note: details and order of topics subject to change
	Solar system and exoplanets	
	Stars	
	Milky Way and nearby galaxies	
	High redshift, cosmology	
	Additional Topics	
	Revision	Mid-term exam. Observing starts.
	Major Project work	
	Major Project work	
	Major Project work	
	Major Project work	
	Major Project work	
	Major Project work	Individual interviews.
	Major Project work	Final Major Project report due.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)

- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)

- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

Lecture content now covers a broad range of introductory material in astronomy, and all lectures are conducted **in person**.

New projects will be offered for the Major Project.