ASTR2020

Advanced Astronomy

Session 2, Special circumstance, North Ryde 2020

Department of Physics and Astronomy

Contents

Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and ot her small group learning activities on campus for the second half-year, while keeping an online ver sion available for those students unable to return or those who choose to continue their studies onli ne.

To check the availability of face-to-face and onlin e activities for your unit, please go to timetable vi ewer. To check detailed information on unit asses sments visit your unit's iLearn space or consult yo ur unit convenor.

General Information

Unit convenor and teaching staff
Joanne Dawson
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Credit points
10

Prerequisites
PHYS201 or PHYS2010

Corequisites

Co-badged status

Unit description
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

Late Assessments Policy

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

The penalty for late submission is deduction of 5% of the possible mark for that item for each 24 hour period (or part) overdue. Assessments will not be accepted for marking if submitted more than 1 week past the due date. Extensions to the due dates for assignments, practical assessments, and project will only be considered if requested with valid reason *prior to the due date*.

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
Project report	60%	No	Milestones throughout semester - see iLearn
Lab reports	20%	No	1 Week after practical is complete - see iLearn
Midession exam	20%	Yes	Week 6

Project report

Assessment Type [1]: Report
Indicative Time on Task [2]: 24 hours
Due: **Milestones throughout semester - see iLearn**
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.

Lab reports

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 20 hours
Due: **1 Week after practical is complete - see iLearn**
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 6**
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.

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[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

The Lectures, Tutorials and Labs in the first half of the unit are designed to support the activities of the Major Project. Participation in the first half is essential for identifying tools and methods required to achieve the aims of the Major Project.

Special lectures

Each week, generally the 3rd lecture of a week will include a guest lecturer. Professional astronomers will describe one of their research projects, including the science goals, project overview, telescope requirements and results. Attendance of these are strongly encouraged for the opportunity to ask questions about their projects and learn about tools or methods they employ in preparation for the Major Project work.

Normal lectures

Generally the 1st and 2nd lectures in a week will be a traditional lecture format on astronomy and instrumentation topics. These will be available through iLearn.

Tutorials

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

Labs

Labs provide hands-on python programming and instrumentation work related to telescope and science-grade astronomical cameras. Labs provide important way to learn tools in preparation for the Major Project. The python labs in Weeks 1-2 will be conducted individually. The other two labs will be pairs of students, who will submit individual lab reports.

Python programming resources

The Major Project and standards labs requires use of the Python programming language. There are signficant 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 get 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
	Introduction to unit	
	Photometry and imaging	

Week	Theme	Special note
	Stars clusters and spectroscopy	
	Radio science and telescopes	
	Radio science and telescopes	
	Revision	Mid-term exam. Project Proposal due.
	Major Project work	Observing starts.
	Major Project work	
	Major Project work	
	Major Project work	
	Major Project work	
	Major Project work	Draft Major Project report due.
	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://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

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

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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 and lab content have been updated and refreshed based upon feedback from previous years.

Marking schemes have been refreshed and improved to help with establishing expectations.

Weight of marks in the Major Project has changed.