ASTR3810

Frontiers of Astronomy and Astrophysics

Session 2, Special circumstance 2020

Department of Physics and Astronomy

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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
Convenor
Matt Owers
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Contact via 02 9850 8910
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By appointment.

Mentor
Richard McDermid
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Mentor
Daniel Zucker
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Credit points
10

Prerequisites
ASTR377 or ASTR3010

Corequisites

Co-badged status

Unit description
Astrophysicists work at the cutting-edge of science, with new results continually streaming in from a host of telescopes, spacecraft and supercomputers. In this PACE unit, students have an opportunity to join this voyage of discovery by planning and conducting their own research project under the guidance of professional astronomers and scientists at CSIRO Astronomy and Space Science, Australian Astronomical Optics at Macquarie, as well as other diverse partner organisations connected with astronomy research, science communication, and education. Students will develop familiarity with the required skills and tools to tackle a real-world astrophysics problem, and the process of conducting research and development projects in a professional context. Students report on their progress and findings through presentations and written reports.

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: Demonstrate insight into the professional activities and work practices of astrophysics researchers, including engagement in regular colloquia, and exposure to professional telescope facilities.

ULO2: Work effectively and responsibly as part of a project team, including the use of online collaborative tools and resources.

ULO3: Think critically and analytically around interpreting the outcomes of a project and identify future strategic directions.

ULO4: Apply techniques of project planning and time management, demonstrating the capacity to meet deadlines agreed upon with the partner.

ULO5: Articulate the goals and results of the project using different forms of communication, including a comprehensive piece of scientific writing, and an oral presentation.

ULO6: Apply your developing career networking skills and capabilities to aid you with either moving into the workforce or further study.

General Assessment Information

In order to pass the unit, you must obtain a total mark of at least 50%, as well as a mark of at least 50% in the Project report.

Assessment Tasks

Name	Weighting	Hurdle	Due
Project Report	25%	Yes	Weeks 7 and 13
Oral Presentation	10%	No	Week 12
Mentor Report	10%	No	Week 13
Project Documentation	15%	No	Weeks 5 and 13
CV and Cover Latter	10%	No	Week 12
Reflective Journal	15%	No	Weeks 2-11
Professional Engagement	15%	No	Week 13

Project Report

Assessment Type [1]: Report
Indicative Time on Task [2]: 10 hours
Due: **Weeks 7 and 13**
Weighting: **25%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

The students are required to submit a Project Report based on their external placement at the partner organisation. This will generally follow the structure of a scientific report, including introduction to the project topic, description of the data, tools and methods used, presentation of results and analysis, discussion of the findings, and conclusions. Typically, students will work in pairs with the partner. In those cases each student is expected to contribute equally to the project report, and the report must include a statement describing the contributions of each student to the joint project.

The Project Report is a **Hurdle Assessment**. *Students must obtain a mark of at least 50% in the report to be eligible to pass the unit.* If the mark for the report is less than 50%, students may be a given a chance to revise and resubmit the report. The mark awarded for the revised report towards the final unit mark will be capped at 50%.

On successful completion you will be able to:

- Demonstrate insight into the professional activities and work practices of astrophysics researchers, including engagement in regular colloquia, and exposure to professional

telescope facilities.
- Work effectively and responsibly as part of a project team, including the use of online collaborative tools and resources.
- Think critically and analytically around interpreting the outcomes of a project and identify future strategic directions.
- Apply techniques of project planning and time management, demonstrating the capacity to meet deadlines agreed upon with the partner.
- Articulate the goals and results of the project using different forms of communication, including a comprehensive piece of scientific writing, and an oral presentation.
- Apply your developing career networking skills and capabilities to aid you with either moving into the workforce or further study.

Oral Presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 7 hours
Due: **Week 12**
Weighting: **10%**

Each student will give a presentation (with time for questions from the audience) on their work in the final week of semester. For students working in pairs, they may present a joint talk, as long as each person presents approximately half of the work. The talk should cover both the research component of the project, and the experience of working at the partner organisation.

On successful completion you will be able to:
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- Think critically and analytically around interpreting the outcomes of a project and identify future strategic directions.
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Mentor Report

Assessment Type [1]: Teacher performance assessment
Indicative Time on Task [2]: 0 hours
Due: **Week 13**
Weighting: **10%**

The Macquarie Project Mentor will provide a report on each student's individual performance during the project. This will be based partly on input from the external project supervisor at the host organisation, as well as exchanges with the Project Mentor during the course of the project. The report will grade performance on topics such as meeting the learning outcomes of the unit, the quality of the student's contribution to the project and partner organisation, and ability to work as part of the project team.

On successful completion you will be able to:

- Work effectively and responsibly as part of a project team, including the use of online collaborative tools and resources.
- Think critically and analytically around interpreting the outcomes of a project and identify future strategic directions.
- Apply techniques of project planning and time management, demonstrating the capacity to meet deadlines agreed upon with the partner.

Project Documentation

Assessment Type [1]: Lab book
Indicative Time on Task [2]: 0 hours
Due: **Weeks 5 and 13**
Weighting: **15%**

Documentation is a key component to any project, and acts as an important record of progress during the semester. It will also form an invaluable record when writing the final report, and will allow students to easily pick up where they left off the previous week when returning to the project. The format of this documentation is flexible, and can be tuned to the specific nature of the PACE project. For example, some projects are well suited to keeping a lab book, either physical or electronic, which records all the daily tasks, recorded values, results, plots, thoughts, useful numbers, etc. For other projects, this documentation may come in a different form, e.g. organised notes or minutes from project meetings, GitHub commit records, or progress reports. The documentation is completed during the PACE activity.

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- Think critically and analytically around interpreting the outcomes of a project and identify future strategic directions.
- Apply techniques of project planning and time management, demonstrating the capacity to meet deadlines agreed upon with the partner.
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CV and Cover Latter

Assessment Type [1]: Non-academic writing
Indicative Time on Task [2]: 5 hours
Due: **Week 12**
Weighting: **10%**

Students will be required to provide a cover letter and curriculum vitae (CV) in response to a genuine job advert that they have researched and selected. An open application to an organisation chosen by the student is also permitted if a suitable job advert is not available. Students will be expected to use the tools and techniques acquired during the unit to find a suitable job opening or organisation, and provide job-specific application materials in the form of a CV and cover letter.

On successful completion you will be able to:

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- Apply your developing career networking skills and capabilities to aid you with either moving into the workforce or further study.

Reflective Journal

Assessment Type [1]: Reflective Writing
Indicative Time on Task [2]: 8 hours

Due: **Weeks 2-11**
Weighting: **15%**

Each student must maintain an individual reflective journal on iLearn consisting of three parts:

Part 1: Initial self-reflection addressing the skills and knowledge gained during your degree thus far. This is the first section of the journal, and should be completed before starting the project.

Part 2: Weekly reflective diary entries, capturing thoughts about the project as it progresses, written using a reflective learning cycle. Students will also be given some key topics to address in this part of their journal. These entries should be written throughout the semester. Bulk submissions in the last weeks will be penalised.

Part 3: Reflection on the project overall. This should be written near the project's completion, and should address: i) What were the main learning outcomes arising from the project? ii) Given the experience in the project, what do students now feel are the most valuable or attractive attributes of their future workplace? How have these changed from before? iii) If the unit could be repeated, what would students do differently and why?

Journal entries are only visible to the unit convenor.

On successful completion you will be able to:

- Work effectively and responsibly as part of a project team, including the use of online collaborative tools and resources.
- Think critically and analytically around interpreting the outcomes of a project and identify future strategic directions.
- Apply techniques of project planning and time management, demonstrating the capacity to meet deadlines agreed upon with the partner.
- Apply your developing career networking skills and capabilities to aid you with either moving into the workforce or further study.

Professional Engagement

Assessment Type [1]: Portfolio
Indicative Time on Task [2]: 11 hours
Due: **Week 13**
Weighting: **15%**

A key role of professional scientists is engaging both with other scientists (through attending seminars) and with the public (through outreach activities). Various opportunities for such activity are available throughout the semester, and may also arise as a result of the placement (e.g. events at the host organisation). To encourage a pro-active approach professional development,

students will build a portfolio of such activities that they chose and plan themselves, and will be required to accrue 'professional engagement credits' during the course of the unit. Activities may include attendance of research seminars, career networking events, and public outreach activities. Diversity of activities is also required.

Students must document their Professional Engagement by providing evidence of engagement and learning. E.g. for seminar attendance, give the date, speaker name, title, and short summary (few lines) of the talk. They may include photos, or any other relevant evidence of the activity. Each activity must include a few sentences describing how the activity has contributed to the student's professional development and career prospects as a scientist.

On successful completion you will be able to:

- Demonstrate insight into the professional activities and work practices of astrophysics researchers, including engagement in regular colloquia, and exposure to professional telescope facilities.
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- Apply techniques of project planning and time management, demonstrating the capacity to meet deadlines agreed upon with the partner.
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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

Workshop Activities

There will be three main workshops associated with the unit, for which attendance is mandatory:

Workshop 1 (Week 1, Friday, 11am-3pm): Orientation

This introductory morning workshop will review the unit goals, give students the chance to

introduce themselves and their project (If known), and review some basic content on best work practices, health and safety, ethics, professional development, and reflective practice. These are essential tools for making the most of your practical experience during the unit.

Workshop 2 (Week 1, Friday, 3pm-6pm): Themes, Knowledge and Skills

This afternoon workshop follows on from workshop 1, and will be aimed at reflecting on the skills and knowledge you have gained across your degree, and how this might map to potential employers, and what they are looking for. We will look at how to recognise our strengths and make best use of them; as well as identifying ares where we can improve, and make plans on how to develop those areas during the unit. Finally, we will make a first draft of a personal curriculum vitae (CV, resume).

Workshop 3 (Week 11, Friday, time will be announced on iLearn): Presentation and interview skills

This workshop will focus on two key opportunities where we present ourselves to our colleagues in a professional context: giving a formal presentation; and giving a job interview. The workshop will look at techniques for delivering an informative and professional presentation, and will go through the process involved in a typical professional job interview. We will use a combination of delivered content and group exercises, including mock interviews, with a focus on developing confidence and experience in presenting in different situations.

Project

The main component of this unit is a project conducted with an external partner organisation, such as the Australian Astronomical Observatory (AAO) or the CSIRO Astronomy and Space Science division (CASS). Projects range from pure research to projects with a more educational or outreach flavour. All projects, however, should give you exposure to a professional working environment, and the opportunity to contribute to a larger effort related to professional astronomy and science. You will spend nominally 100 hours working with the partner organisation, spread over 10 weeks of the semester (but this can vary from project to project). We suggest you spend one week of the mid-semester break, and 9 Fridays working at the external organisation, however the hours will need to be negotiated with your external supervisor. Projects should start in Week 2, concluding in Week 11, but again there will be some variations in schedule according to the particular project.

Supervisors

The project has a supervisor at the host organisation, who is able to devote some time to supervising the students on the days that they are working with the host organisation. At the start of the project, agree on a time or day when you are most likely to have overlap with your supervisor. If you don't have regular access to your project supervisor, let the unit convenor know as soon as possible so that alternative arrangements can be made.

The Physics and Astronomy Department at Macquarie University also appoints a University staff supervisor/mentor to maintain liaison, monitor progress and assist in advising students. Students will meet with the Unit convenor / University Supervisor at least twice during the semester to review lab-books, work diaries and progress against project objectives. One of these meetings will take place with the supervisor at the host organisation.

Required Unit Materials

You may be working within the premises of the partner organisation. If so, compliance with standard Work Health and Safety (WHS, sometimes also called Occupational Health & Safety, or OH&S) practise is expected. This includes wearing appropriate clothing and footwear (e.g. covered shoes), and following all workplace rules as defined by the Partner. If you are unsure of these rules, ask your supervisors.

Required Text

Not applicable, but project supervisors may recommend relevant readings.

Record-keeping

Each student must maintain an individual lab book or work diary. The lab book needs to be completed for each day of work on the project. Entries in the lab book must be viewed and approved as correct records by the Partner supervisor on a regular basis (at least fortnightly). Students will be required to hand in their lab books to the Partner supervisor as part of the assessment process. The work diary is a record of the additional reading and reflective research undertaken by each student on areas relevant to working in an industry environment. Students will be required to hand in their diaries to the University supervisor as part of the assessment process.

Teaching Strategy

Students spend around 14 days working with the host organisation. This time should be used effectively in the pursuit of the objectives identified by the partner supervisor and unit learning outcomes. A clear understanding of the project objectives and appropriate planning will facilitate progress towards the project objectives. Students are expected to regularly graph and analyse their results (if appropriate), and keep comprehensive and up-to-date records in their lab-books. The Partner and University supervisor/mentor will review the research plan and lab-books to ensure good practise in this respect. Students are also expected to maintain a work diary that captures other project related reading and reflective analysis undertaken by the student.

Unit Schedule

PACE

PACE stands for Participation and Community Engagement. By connecting students with partner organisations, PACE gives Macquarie students the chance to contribute their academic learning, enthusiasm and fresh perspective to the professional workplace. ASTR310 has been a PACE unit since 2013. PACE activities in this unit includes astronomy outreach at our Macquarie University observatory and activities at either the Australian Astronomical Observatory or CSIRO Astronomy and Space Science.

Attendance

The unit has two key elements: Skills workshops (3 workshops over 2 days), and external project (14 days over semester). Attendance of these two components is mandatory.

Students are expected to work standard work hours on the days they agree to work with the host

organisation, and may be required to be on-site at the host organisation when undertaking the project. The total project duration is 14 days. Typically, students will devote one day a week (nominally Friday) during 2nd semester (Weeks 1 to 11), and one week (5 days) during mid-semester break, working on the project with the partner institution. On some of these days some time may be spent at the University or elsewhere pursuing the objectives of the project with the agreement of the partner supervisor.

In addition, there will be several 'workshop' activities during the semester on topics including ethics, communication, and career skills (see above).

Professional Engagement

A total of 15 'Professional Engagement' credits must be earned by participating in professional activities during the semester. This includes mandatory attendance of at least 3 seminars/ colloquia (worth 1 credit each) over the course of the semester. Additional credits can be gained by participating in suitable professional development activities, such as external skill development workshops, building a professional online profile, public outreach, etc. The unit convenor has the final say on what counts for credit and at what level.

Progress Meetings

Students are required to participate in progress meetings with the external host as arranged by the University supervisor. At least one such meeting will take place during the project.

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/p

olicy-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

Removal of Field trip due to COVID19.