



PHYS311

Professional Physics

S2 Day 2018

Dept of Physics and Astronomy

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Disclaimer

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General Information

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Unit convenor, Lecturer, Mentor

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Credit points

3

Prerequisites

PHYS301

Corequisites

Co-badged status

Unit description

As a PACE unit and the capstone unit for the Physics Major, PHYS311 brings together the learning outcomes from the major, and explores how Physics skills and the broader scientific methods open doors to a wide range of career paths. The unit begins with a reflective stage in which small groups build their own model of the technical themes and generic skills developed during their degree, and consider how to market these skills to potential employers. Students then develop a professional resume and cover letter targeting actual employment advertisements seeking physicists, and engage in peer review of their documents. The larger part of the unit provides an opportunity to engage with the broader community through a PACE activity of at least three weeks, conducted in partnership with an industrial, research, or educational institute. Students will apply their skills to a real world problem of interest to the partner, and report on their experiences, solutions and the project outcomes in a variety of formats including a technical report, high level executive summary, oral presentation and an online discussion forum that joins all participants across different projects and sites.

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:

Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.

Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas

Demonstrate planning and management skills, including a capacity to meet agreed deadlines

Articulate the goals and results of a project using different forms of communication.

Work effectively and ethically in a multifaceted scientific environment

Critically reflect on the development of Graduate Capabilities and experience working in an external organisation

Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

General Assessment Information

As a PACE and Capstone unit, this unit involves a major project and, in most cases, group work. 60% of the overall mark for the unit is related to the major project, and the components of this mark are the Project Report (25%), Lab book (15%), Presentation (10%) and Mentor report (10%). Students will receive individual marks for their lab book, presentation and mentor reports.

Under normal circumstances, the students contributing to a group report will receive a common mark. In exceptional circumstances, eg dictated by the statements of contributions, individual marks may be considered.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Project Report</u>	25%	No	Week 13
<u>Project Lab Book</u>	15%	No	Week 7 and Week 10
<u>Oral Presentation</u>	10%	No	Week 12
<u>Reflective Journal</u>	15%	No	Weekly, 10 times, Weeks 1-13
<u>Professional Engagement</u>	15%	No	Week 13
<u>CV and Cover letter</u>	10%	No	week 12
<u>Mentor Report</u>	10%	No	Week 13
<u>Workshop participation</u>	0%	No	Friday weeks 1 and 11

Project Report

Due: **Week 13**

Weighting: **25%**

The students are required to submit a 2500-5000 word 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. Note that in some cases Project progress and timely conclusion can be influenced by circumstances that are outside of the Student's control. This will be taken into account when assessing the report. Under normal circumstances, the students contributing to a group report will receive a common mark. In exceptional circumstances, eg dictated by the statements of contributions, individual marks may be considered.

Students are strongly encouraged to make an appointment with their Mentor around Week 8-9 to discuss their Project Report. They should have bring along an outline for their report, and any parts they have drafted.

On successful completion you will be able to:

- Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.
- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
- Articulate the goals and results of a project using different forms of communication.
- Work effectively and ethically in a multifaceted scientific environment

Project Lab Book

Due: **Week 7 and Week 10**

Weighting: **15%**

An individual Project Lab Book will be kept by each student. It will record all your daily tasks, recorded values, results, plots, thoughts, useful numbers, etc. and should form a crucial record of your activity to draw on when writing your project report. It will also be essential for efficiently picking up your project where you left off the previous week. In most cases, the Lab book will be a hand-written note-book that will be provided to the students. In other cases it may be an electronic document, an online tool (e.g. Evernote), Either way, keep it legible, organised, dated, and well used.

Lab books will be marked (5 marks allocated) by your Mentor in around Week 7 - you will need to make an appointment and bring your labbook for marking, and they will provide feedback on how you might be able to improve your lab book. The remaining 10 marks will be allocated by your Mentor in around Week 10.

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- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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Oral Presentation

Due: **Week 12**

Weighting: **10%**

Each student will give a 10 minute presentation (with 3 minutes for questions) on their work in

the final week of semester. For students working in pairs, they may present a joint 20 minute 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. Students will be graded individually.

On successful completion you will be able to:

- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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- Work effectively and ethically in a multifaceted scientific environment
- Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

Reflective Journal

Due: **Weekly, 10 times, Weeks 1-13**

Weighting: **15%**

Each student must maintain an individual reflective journal 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 in Week 2. Part 2: Reflective Diary: Eight (or more) entries, spaced by at least 6 days, which capture your thoughts about the project as it progresses. You will be given some key topics to address in this part of your journal as you go along. Part 3: Reflection on the project overall. This should be written after completing the project, and should address: i) What were the main learning outcomes for you arising from the project? ii) Given the experience you have had through the project, what do you now feel are the most valuable or attractive attributes of your future workplace? How have these changed from before? iii) If you could repeat the unit, what would you do differently and why?

Further details and advice are provided on iLearn and in Workshop 1, and students are encouraged to contact the Unit staff for advice if they are struggling with this task.

On successful completion you will be able to:

- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
- Work effectively and ethically in a multifaceted scientific environment
- Critically reflect on the development of Graduate Capabilities and experience working in an external organisation

- Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

Professional Engagement

Due: **Week 13**

Weighting: **15%**

A key role of professional scientists is engaging both with other scientists and with the public (through relevant outreach activities). In this context, students are required to accrue at least 15 'professional engagement credits' during the course of the unit. Examples of relevant activities worth 1 credit are: Joining a professional organisation such as the Australian Institute of Physics (free or undergraduates), attending a Physics and Astronomy Department colloquium or public lecture, etc. A 2-credit example might be attending a careers event, or reading and discussing a journal paper or an article in the Australian Physicist. 3-credit activities could be volunteering to help on University Open Day, or giving a presentation at a school. No more than 5 credits can be claimed for similar activities, and more examples and instructions are provided on iLearn.

Each student needs to prepare and submit a **Record of Professional Engagement**. This should be one single document with a summary table at the beginning that documents each activity and the number of credits claimed. Then for each activity, please provide a few details, a piece of evidence of your activity, and describe in a few sentences how each activity has *contributed to your professional development and career prospects as a physicist*. You may wish to use the word template provided on iLearn to document each activity. Photos are encouraged.

On successful completion you will be able to:

- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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CV and Cover letter

Due: **week 12**

Weighting: **10%**

You will be required to provide a cover letter and curriculum vitae (CV) in response to a genuine job advert or as an open application to an organisation you have chosen. You will be expected to use the tools and techniques you have acquired during the unit to find a suitable 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:

- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
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Mentor Report

Due: **Week 13**

Weighting: **10%**

There is no submission required for this task.

Your Macquarie Mentor will provide a report on your individual performance during the project. This will be based partly on input from your external project supervisor, as well as the exchanges you have had with your Macquarie Mentor during the course of the project. The report will grade performance on topics related to the learning outcomes of the unit, the quality of your contribution to the project and partner organisation, and ability to work as part of the project team. Engagement with the project activity will also be included in this assessment.

On successful completion you will be able to:

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- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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- Critically reflect on the development of Graduate Capabilities and experience working in an external organisation

Workshop participation

Due: **Friday weeks 1 and 11**

Weighting: **0%**

There are three workshops scheduled. Workshops 1 (Unit Introduction and Orientation) and Workshop 2 (My Degree - themes, skills, knowledge) will run sequentially from 11am - 6pm on Friday 3rd August (Week 1) and lunch will be provided. Workshop 3 will be held on Friday 26th October. It will run for three hours, and the time and location will be announced on iLearn.

Students must participate meaningfully in all three workshops. *If you miss a workshop due to unforeseen circumstances, you should apply for special consideration.*

On successful completion you will be able to:

- Critically reflect on the development of Graduate Capabilities and experience working in an external organisation
- Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

Delivery and Resources

Workshop Activities:

There will be three main workshops associated with the unit, for which attendance is mandatory: **Workshop 1** (Friday Week 11-3 am, lunch provided, Physics Multipurpose Room E6B 2.600): *Unit Orientation*. This introductory morning workshop will review the unit goals, give students the chance to introduce themselves and their project, 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** (Friday Week 1, 3-6 pm, afternoon tea provided, multipurpose room): *My Degree - 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 areas 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, time and location to be advised on iLearn): *Presentation 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. 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 physics. You will spend

nominally 100 hours working with the partner organisation, spread throughout the semester. 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 and you may be required to spend additional days during the mid-semester break. Projects should normally start in Week 2, concluding in Week 10, but again there will be some variations in schedule according to particular circumstances. If you miss a day of your placement due to unforeseen circumstances, you should plan to make up the hours and/or apply for special consideration.

We will do our best to advise all students about their placement and project prior to Week 1. However we regret if due to circumstances beyond our control this is not possible for all students.

Supervisors and Mentors

Students will have a supervisor at the host organisation, who is able to devote some time to supervising the students on the days that they attend 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 PHYS311 academic mentor to liaise with the host organisation, monitor progress and assist in advising students. Students will meet with their University mentor at least three times during the semester to review lab-books, progress against project objectives, etc. Some of these meetings will take place at the host organisation (usually around week 2 and week 10), and you are required to make an appointment with your Mentor during weeks 7 and 8 so they can inspect your lab book and discuss your project report with you.

Required Unit Materials

You will be working within the premises of the partner organisation. Compliance with standard Work Health and Safety (WHS, sometimes also called Occupational Health & Safety, or OH&S) practice 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 pair must maintain a lab book. 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 may be required to hand in their lab books to the Partner supervisor at the end of the unit.

Teaching Strategy

Students spend around 100 hours working within 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 host supervisor and University mentor will review the lab-book to ensure good practice in this respect.

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.

Attendance The unit has two key elements: Skills workshops (3 workshops over 2 days), and the external project (100 hours over semester). Attendance of both components is mandatory, as well as at other activities that be organised during semester. Students are required to be on-site at the host organisation when undertaking the project. The total project duration is 100 hours. Typically, students will devote one day a week (nominally Friday) during 2nd semester (Weeks 1 to 13) and one week in their mid-semester break, working on the project at 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 may be '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. The unit convenor has the final say on what counts for credit and at what level.

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) (<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.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/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) ([http](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central)

[s://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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 shown in *iLearn*, 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.

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 improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

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

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.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be

imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.
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- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
- Articulate the goals and results of a project using different forms of communication.
- Work effectively and ethically in a multifaceted scientific environment
- Critically reflect on the development of Graduate Capabilities and experience working in an external organisation
- Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

Assessment tasks

- Project Report
- Project Lab Book
- Oral Presentation
- Reflective Journal
- Professional Engagement
- CV and Cover letter
- Mentor Report
- Workshop participation

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Apply problem-solving skills in a real-world context using discipline-specific knowledge

and skills from throughout the Physics program.

- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.
- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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- Mentor Report
- Workshop participation

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.
- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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- Workshop participation

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

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- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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- Oral Presentation
- Reflective Journal

- Professional Engagement
- CV and Cover letter
- Mentor Report
- Workshop participation

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.
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- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
- Articulate the goals and results of a project using different forms of communication.
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- Professional Engagement
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- Workshop participation

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to

read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Apply problem-solving skills in a real-world context using discipline-specific knowledge and skills from throughout the Physics program.
- Employ the tools, methodologies, language and conventions of Physics to develop and test new ideas
- Demonstrate planning and management skills, including a capacity to meet agreed deadlines
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Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Articulate the goals and results of a project using different forms of communication.
- Work effectively and ethically in a multifaceted scientific environment
- Critically reflect on the development of Graduate Capabilities and experience working in an external organisation
- Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

Assessment tasks

- Project Report
- Project Lab Book
- Oral Presentation
- Reflective Journal
- Professional Engagement
- CV and Cover letter
- Mentor Report
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Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Articulate the goals and results of a project using different forms of communication.
- Work effectively and ethically in a multifaceted scientific environment
- Critically reflect on the development of Graduate Capabilities and experience working in an external organisation
- Demonstrate networking skills and capabilities that will assist with either moving into the workforce or further study.

Assessment tasks

- Project Report
- Project Lab Book
- Oral Presentation

- Reflective Journal
- Professional Engagement
- CV and Cover letter
- Mentor Report
- Workshop participation