



# BIOL381

## Palaeobiology

S2 External 2019

*Dept of Biological Sciences*

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#### **Disclaimer**

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## General Information

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Credit points

3

Prerequisites

39cp at 100 level or above including ((3cp from BIOL or GEOS units at 300 level) and 6cp from (BIOL261 or BIOL263 or BIOL262 or BIOL208 or BIOL228 or BIOL227 or BIOL235 or GEOS206 or GEOS226))

Corequisites

Co-badged status

Unit description

The fossil record is our best guide to large-scale evolutionary patterns and processes. This unit will include a mix of palaeobiology readings, written reviews, seminars, supplementary lectures and lab sessions to explore into the most interesting research, techniques, controversies, debates and discoveries in the discipline of palaeobiology. Key macroevolutionary themes will be explored including evolutionary trends, time scales, palaeoecology, phylogenetics, and the evolution of major marine and terrestrial groups. This unit is the Capstone for the Major in Palaeobiology.

## 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:

1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level
3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
6. Practice and reflect on appropriate professional ethics
7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature
8. Gain insight and experience with post degree career options in palaeobiology and related disciplines

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Module Assessments</u> x 3	39%	No	see Schedule
<u>3.4 Major Essay</u>	25%	No	Friday 14 September [end of Week 7] at (or before) 23.59 pm
<u>3.3 Scientific Research Grant</u>	20%	No	Friday 18 October [end of Week 10] at (or before) 11.59 pm
<u>Scientific Poster</u>	16%	No	Week 13 Monday 4 Nov between 2-5 pm.

### Module Assessments x 3

Due: **see Schedule**

Weighting: **39%**

## Module Assessments

There will be 3 x 2-week module sessions during the unit (see Schedule for details) that will focus on advanced aspects of palaeobiology. See the BIOL381 iLearn page for all the details on what is expected for each module. Modules will be convened by separate staff members and will include a mix of assessments tasks including short written evaluations and online Quizzes. Each module will have a mix of lectures, guest lectures, discussion forums, workshops and practical Lab exercises/demonstrations. The “Lectures” slots will include mixed mode activities and will be held in 10MW 269 (E3A) on Fridays from 2.00-4.00 pm. The Lab sessions will be held in E5A 220 on Mondays from 2:00 to 5:00 PM. These sessions are **COMPULSORY** for the unit. There will be no other opportunity to complete these Modules and if you miss them only the Lecture part will be recorded. Other non-lecture activities WILL NOT be recorded and so you need to be present to pass the assessment tasks associated with each Module. Please see schedule for exact dates required for attendance. **I reiterate, students are expected to attend all 6 Lecture and Lab sessions across the 3 Modules.**

The Module Lab sessions will include a mix of hands-on surveys, measurements and identification of fossils, exposure to new and traditional palaeobiology techniques and methods as well as computer-based exercises that introduce the core methods of analytical palaeobiology. All students of palaeontology should have a basic understanding of these concepts and techniques. You will be provided with the skills to not only conduct your own analyses but to also critically assess those in the literature.

On successful completion you will be able to:

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level
- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 6. Practice and reflect on appropriate professional ethics
- 8. Gain insight and experience with post degree career options in palaeobiology and related disciplines

## 3.4 Major Essay

Due: **Friday 14 September [end of Week 7] at (or before) 23.59 pm**

Weighting: **25%**

Each BIOL381 student is expected to submit one major Essay on a topic of your choice **within 5 broad areas of palaeobiological research** focussed on current, controversial or interdisciplinary palaeobiological research. Please **CAREFULLY READ** the instructions for the Major Essay posted under ASSESSMENT on the BIOL381 iLearn page. The key premise of the

essay is that it must have **an “evolutionary” theme** and focus on data derived from the fossil record. In this respect, the core question(s) to be evaluated in the Essay might focus on (list not exhaustive) phylogenetic relationships, life history reconstruction, functional morphology, palaeobiological reconstruction, timing of key lineage splits, origination and extinctions. Obviously, the key data for the Essay must come from primary scientific papers detailing data/ results/ interpretations from the fossil record.

### Essay format

Please SEE the detailed instructions for the Essay scope, topic and format on iLearn webpage! The text here is more summary and introduction.

For this essay, you are required to formulate your own ideas, interpretations and conclusions regarding the strengths and weaknesses of the data presented in a series of published papers on a topic of your choosing. Please see the Essay Instructions for details about the **5 broad areas of palaeobiological research** your essay must be chosen from. **Do not simply summarise each paper.** For this essay, it is essential that you read a wide array of primary literature.

The Essays also **must be written in your own words**. You must not copy material from any source without attribution. Any copied words, no matter how few, must be placed in quotation marks. If you copy anything without attribution *or* without using quotation marks *you will not receive credit* for the relevant part of the Essay. If you have copied without attribution, then depending on the severity of the case you may be reported to the Faculty Student Administration Manager, in accord with the Academic Honesty Procedure (see the Policies and Procedures section).

Please write in a concise, well-organised manner. If you are not feeling very confident in your ability to do so you may want to purchase the short, simple volume by W. Strunk and E.B. White, *The Elements of Style*, Macmillan (normally available in the Co-op bookshop).

For detailed instructions on how to format your essay please see the instructions posted Important points to note regarding the format and structure of the Major Essay:

- Word limit is 2500 words  $\pm$  10% *not* including the references. Include an accurate word count on the front of the Essay.
- Essays must be word processed using 12 pt font and 1.5 line spaced. Hand written Essays will not be accepted.
- The Essay *must* include additional, but relevant supporting figures, graphs, or tables.
- The Essay should be written in the succinct, tight style of a scientific paper following the format of a mainstream science journal such as *Paleobiology*
- Make sure all primary information sources used are cited in the text in the appropriate manner. A full reference list presented in alphabetical order and written in journal style should be included at the end of the Essay. Only sources cited in the main text of the Essay should be listed in the reference list.

- Regardless of the details, you **MUST** use the Harvard Referencing Style when writing your Essays. This means use of footnotes or numbered reference citation (Oxford referencing style) should be completely avoided.

The Library Web page (<http://www.library.mq.edu.au/>) has a number of very useful databases for searching out relevant primary sources. Use databases such as Web of Knowledge or Scopus or publisher websites such as BioOne, JSTOR, ScienceDirect, Springer Link or Wiley Online Library when searching for information.

Note that a primary source is a paper published in a peer reviewed international scientific journal that presents new scientific data and is not simply a review of existing research. A secondary source is a review or compilation of the research work performed by other workers. Examples of secondary sources include Wikipedia, textbooks, popular science magazines (e.g. New Scientist), newspapers, and most other websites (though there are exceptions such as the online journal Palaeontologica Electronica).

Major Essay marking criteria (Summary – Full rubric available on iLearn)

Marks for the Major Essay will be allotted for the following:

1. Scientific content, meaning how well you have researched and evaluated the evidence to support your answer written in your own words. **50%**
2. Logical organisation, spelling, grammar, and conciseness. Use sub-headings. **20%**
3. Comprehensiveness, relevance, and formatting of the references you have consulted in researching your topic and *cited in the text* (see Harvard Referencing Style Guide). **20%**
4. Relevance, effectiveness, and referencing of figures, graphs and/or tables. At least one figure, graph, or table *must* be included. **10%**.

Important note: anything not in your own words does not demonstrate researching the topic; evaluating the evidence; writing logically and grammatically; or finding references on your own. Therefore, if you copy extensively *you may receive little or no credit* in any or all of these areas.

On successful completion you will be able to:

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature

### 3.3 Scientific Research Grant

Due: **Friday 18 October [end of Week 10] at (or before) 11.59 pm**

Weighting: **20%**

For this Assessment Task you will prepare a Scientific Research Grant Proposal under the broad research topic of ‘**Interdisciplinary studies in Palaeobiological Research**’ funded by the hypothetical organisation called the Deep Time Institute of Australasia.

The aim of this task is to for you to learn how to develop new research strategies and questions that integrate separate interdisciplinary scientific fields to research, synthesise or solve outstanding questions in palaeobiology. It will provide practice in formulating a research question, devising a research plan that will allow you to experience the challenges of writing a research grant proposal.

Please CAREFULLY READ the instructions for the Scientific Research Grant Proposal posted under ASSESSMENT on the BIOL381 iLearn page.

All Scientific Research Grant Proposals **MUST** be completed via the online application form available on the BIOL381 iLearn website. **Total word length is limited to 1500 words.**

All sections of the applications must be completed (or at least attempted) – note that text- boxes have fixed size with strict word limits (see below) that cannot be exceeded. All applicants **MUST** use an **11-point font** when completing the application.

Reference to primary peer-review papers must be cited throughout the proposal using the **Oxford System** for bibliographic citation which is based on a superscript numbering system. An Example of a recent ARC Grant Application can be found on the iLearn Website as an example of the style of referencing required.

For precise details of the requirements for this Assessment task please see the separate file “Scientific Research Grant Proposal Instructions and Format” under the ASSESSMENT section on the iLearn Web site.

#### ASSESSMENT CRITERIA:

This outlines the criteria for Assessment and the weighting each of the sections will be given by Independent Reviewers (markers) for this Task.

##### *Title, Background, Rationale and Aims (20%)*

- Is the title clever, accurate and relevant?
- How clearly is the background and rationale for the project explained?
- Are the citations/figures used up to date, comprehensive and relevant?
- Are the aims clear and concise -achievable

##### *Overall Project Quality, Significance and Innovation (25%)*

- Does the research address a significant problem?
- Is the conceptual/theoretical framework for the project innovative and original?
- Will the aims, concepts, methods and results advance palaeobiological knowledge?
- Does the project open new research frontiers or solve a more basic palaeobiological question?
- How up to date and comprehensive are the sources used.



*Research Plan, Methods, Feasibility and Interdisciplinarity (25%)*

- Do the project's research design, methods and techniques create confidence in the timely and successful completion of the project?
- Are the research plan and proposed methods clearly articulated, researched and well suited to fulfilling the overall aims of the project?
- Is the level of interdisciplinarity clearly outlined and appropriate for the project?
- Are the necessary facilities and equipment available to complete the Project?

*Expected Outcomes, Educational Outreach (15%)*

- Are the expected outcomes reasonable, feasible and well justified?
- Do the outcomes fulfil the original aims and research goals of the project?
- Is the strategy for educational outreach to scientific peers, schools and general public pitched at an appropriate level and through correct media/publications?

*English Expression, Spelling, Organisation, Referencing (15%)*

- Is text well written, clearly and concisely expressed in a logical manner and free of spelling errors?
- Does the referencing match the required format and is it accurate, up-to-date and comprehensive?

On successful completion you will be able to:

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- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
- 6. Practice and reflect on appropriate professional ethics
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature
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## Scientific Poster

Due: **Week 13 Monday 4 Nov between 2-5 pm.**

Weighting: **16%**



Posters are a time-honoured way to communicate scientific research in the academic community, and there are very few international scientific conferences that do not include poster sessions in their program. The aim of this assessment task for each student to gain experience in producing a research poster that could be submitted to an international congress. Research posters provide a critically important way for early career researchers to communicate their scientific research to a wide audience of peers via a short, concise review or evaluation of the author(s) research. They also let you communicate in more detail to a smaller number of particularly interested people who are prepared to spend time absorbing the finer points of your message.

Each student will be required to produce ONE research poster for this unit. The poster can be based on the same topic as your Major Essay OR Research Grant Application OR a completely different topic from the fossil record.

#### General Instructions for Poster Presentations

Each poster should be **no larger than A1 size (= 595 mm x 840 mm)**. This is equivalent to 8 x A4 sheets. Your name + reference list **must** be clearly visible on the **front** of the poster.

There are numerous templates for producing scientific posters in programs such as PowerPoint, Adobe Illustrator or Photoshop. In addition, there are a number of freeware programs that can produce professional posters too. You can search the web to find alternatives that best suit you. Using a template is important because it provides a clear, logical organisation and flow for the poster (marks are given for clarity and organisation). It is not expected that you will need spend huge sums of money producing a highly professional, full colour print (although you may do so if you wish). The poster can be produced as a single A1 sheet or as 4 x A3 sheets, if you wish. You will have to decide how best to present your poster.

If you would like to have your poster printed at A1 size, there are a number of services that commercially print posters. Some even take online submissions and mail the poster to an address of your choice within a few days. For example, **Officeworks** offer full colour printing of A1 size posters for between \$30-45 depending on paper type and quality. Postage and Handling is extra.

Macquarie University also offers the online Ergo Print Centre – which enable posters to be uploaded and printed. Cost is variable. You can get a quote before you print anything.

Contact is [MUprintenquiries@ergoasia.com](mailto:MUprintenquiries@ergoasia.com) or Ph: 9850 6305.

The link is here: [http://www.mq.edu.au/business\\_and\\_community/printery/](http://www.mq.edu.au/business_and_community/printery/)

[macquarie\\_lighthouse\\_press/](https://unitguides.mq.edu.au/unit_offerings/100903/unit_guide/print)

For precise details of the requirements for this Assessment task please see the separate file “Poster Presentation - Instructions and Format” under the ASSESSMENT section on the iLearn Web site.

On successful completion you will be able to:

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature

## Delivery and Resources

This is a non-traditional unit in that there will **NOT** be weekly lectures and labs. Instead the unit will include **3 x 2-week modules [Modules 1-3]** convened by different palaeontology staff members and invited guests. The modules will include a mix of activities that may include lectures, discussion, readings, workshops and “hands on” activities with a range of fossils, new software and frontier imaging techniques. The unit emphasizes using fossils to understand palaeobiology, palaeoenvironments, time scales, mass extinctions, and diversity trends.

BIOL381 is a capstone unit that allows you to demonstrate what you have learnt over the course of your degree, apply and learn specialist skills and methods whilst completing units of study within the Palaeobiology Major. This capstone will provide further opportunities to learn more advanced ideas through data mining for a major essay of your choice and new lab, software and field techniques over **3 x 2-week modules** focused on quantitative analyses and applications, frontier imaging techniques and conservation palaeoecology.

Capstone units are designed to assist you make the transition from an undergraduate university environment to the workplace or into postgraduate study. Capstones provide an opportunity to consolidate what you have learned as an undergraduate, assess your strengths and skills in the context of your future career path and explore how your skills can be applied in the wider world.

*iLearn.* BIOL381 has an online presence on iLearn. You will need your MQ ID and password to log in. You are expected to use iLearn to access the unit outline, schedule, Module readings and recordings, and quizzes. The iLearn page also has other useful information and links for the unit. Any updates, announcements, or changes to the unit will be posted on iLearn. As such, it is strongly recommended that all students log into the BIOL381 iLearn site at least twice a week throughout the entire semester.

*Turnitin.* Macquarie University uses an online anti-plagiarism detection tool called *Turnitin*. All students enrolled in BIOL381 must submit the Major Essay and Poster text to *Turnitin*.

This program works by comparing each student's work with the work of other students enrolled in the unit (both past and present) and with material found online (e.g. websites and scientific papers).

**IMPORTANT POINT ABOUT ALL ASSESSMENT TASKS:** As advanced 300 level

undergraduates, you are required to research and prepare your work to the highest standards. You will need to undertake detailed data mining, read widely and rigorously assess and evaluate the data/evidence from the primary literature. I want YOUR critical evaluation/synthesis of papers for each assessment task, not someone else's. I re-iterate again, that all written Assessment Tasks MUST be written in **YOUR OWN WORDS**. Do not copy and paste text from the core papers – this is plagiarism. Do not copy and paste text from the papers and change a few words – this is plagiarism! Do not reuse Figures without clearly citing the source.

The University has very strict policies relating to this type of cheating which will result in reference to the Faculty of Science and Engineering Discipline Committee (FSEDC). Any student who is suspected of plagiarism will be referred to the FSEDC who will decide the appropriate penalty. See Policy Central for full details on how the university deals with plagiarism.

## Unit Schedule

See BIOL381 Schedule on iLearn

## 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) (<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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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](http://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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/](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**

- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level
- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature
- 8. Gain insight and experience with post degree career options in palaeobiology and related disciplines

## **Assessment tasks**

- Module Assessments x 3
- 3.4 Major Essay
- 3.3 Scientific Research Grant
- Scientific Poster

## **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**

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level
- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes

- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 6. Practice and reflect on appropriate professional ethics
- 8. Gain insight and experience with post degree career options in palaeobiology and related disciplines

## **Assessment task**

- 3.3 Scientific Research Grant

## **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**

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level

## **Assessment tasks**

- Module Assessments x 3
- Scientific Poster

## **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**

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level

- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature
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## **Assessment tasks**

- Module Assessments x 3
- 3.4 Major Essay
- 3.3 Scientific Research Grant
- Scientific Poster

## **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**

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level
- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature

## **Assessment tasks**

- Module Assessments x 3
- 3.4 Major Essay
- 3.3 Scientific Research Grant



- Scientific Poster

## 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

- 1. Utilise fossils combined with analytical skills to solve advanced evolutionary problems
- 2. Apply frontier imaging, lab and field techniques and industry standard software to analyse fossil material at an advanced level
- 3. Apply advanced numerical methods that involve faunal turnover, extinction and conservation palaeobiology
- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature

### Assessment tasks

- Module Assessments x 3
- 3.4 Major Essay
- 3.3 Scientific Research Grant
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## 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

- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 6. Practice and reflect on appropriate professional ethics

- 7. Integrate skills to demonstrate capacity at producing primary scientific manuscripts and research proposals based on readings of the primary palaeontological literature
- 8. Gain insight and experience with post degree career options in palaeobiology and related disciplines

## **Assessment tasks**

- Module Assessments x 3
- 3.4 Major Essay
- 3.3 Scientific Research Grant
- Scientific Poster

## **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**

- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes
- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 6. Practice and reflect on appropriate professional ethics

## **Assessment task**

- Module Assessments x 3

## **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**

- 4. Advocate for the importance of interdisciplinary linkages in understanding palaeobiology and processes

- 5. Assess and plan for future careers through the recognition and development of transferable interdisciplinary skills
- 6. Practice and reflect on appropriate professional ethics
- 8. Gain insight and experience with post degree career options in palaeobiology and related disciplines

## **Assessment task**

- 3.3 Scientific Research Grant