BIOL379

Reef Evolution and Dynamics

S1 External 2017

Dept of Biological Sciences

Contents

General Information

Unit convenor and teaching staff
Unit Convenor
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Credit points
3

Prerequisites
39cp at 100 level or above including ((BIOL261 or BIOL263) and (BIOL208 or BIOL227 or BIOL228 or BIOL235 or BIOL262 or GEOS206 or GEOS226)) or (9cp from BIOL units and 9cp from GEOS or ENVS units)

Corequisites

Co-badged status

Unit description
Modern coral reefs are dynamic systems consisting of a complicated interplay of biological, chemical and geological processes that presently cover approximately 600,000 square kilometres of the Earth's surface. The aims of this unit are to provide each student with first-hand experience of modern reefs as dynamic systems by using quantitative and qualitative scientific methods and techniques to explore a diverse range of multidisciplinary topics including: reef formation and structure; reef zonation; carbonate sedimentology; biodiversity; ecology; taxonomy; taphonomy; symbiosis; recruitment; bioturbation and bio-erosion; human impacts on reef systems; global warming; and the evolution and importance of reef formation in the geological record. This latter point is a particular focus – students learn about the changes associated with the evolution of reefs through geological time. The study of ancient reefs provides a counterpoint and analogy to the modern reef setting studied in the field. The unit involves a compulsory two day on-campus session and an eight day field excursion to Heron Island Research Station, Capricorn-Bunker Group, Great Barrier Reef (separate excursion fee applies).

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:

Explain the interactions between biological, physical, and historical processes that produce modern reef environments.

Explain and distinguish the key mechanisms and characteristics governing the preservation of living communities as fossil assemblages.

Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.

Apply and critique field methods in the context of different research goals.

Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

General Assessment Information

Attendance at both days of the on campus session is compulsory. Students who fail to attend both days of the on campus session will need to withdraw from the unit.

Attendance for the entirety to the field trip is compulsory.

Students must complete all assessable tasks AND receive a final mark of >50% to pass this subject.

While data collection and analyses will often be conducted in groups, students are expected and required to use their own words in all written assignments. All collaborative aspects of work will be acknowledged as instructed in the assignment instructions. Penalties for plagiarism range from a loss of marks to awarding of a zero depending on the level of plagiarism and reporting to Faculty disciplinary committee.

Disruption to Study

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

Assessment Tasks

Name	Weighting	Hurdle	Due
On Campus Practical	4%	No	Week 3
Pre-trip online activities	12%	No	Weeks 1 - 5

Name	Weighting	Hurdle	Due
Fieldwork data and analysis	23%	No	During fieldtrip
Laboratory exam	25%	No	During Fieldtrip
Independent project report	25%	No	Weeks 8 & 12
Project report reviews	11%	No	Weeks 10 & 12

On Campus Practical

Due: **Week 3**
Weighting: **4%**

Student will complete and iLearn quiz as well as submit data and figures with captions related to the on campus activities.

On successful completion you will be able to:

- Explain the interactions between biological, physical, and historical processes that produce modern reef environments.
- Explain and distinguish the key mechanisms and characteristics governing the preservation of living communities as fossil assemblages.
- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.

Pre-trip online activities

Due: **Weeks 1 - 5**
Weighting: **12%**

Eight learning modules will be available via iLearn. These activities are designed to refresh and/or provide the knowledge that will be assumed once we get to Heron Island. The assessment will be done via iLearn quizzes and activities on an ongoing basis between the start of the session and the field trip.

On successful completion you will be able to:

- Explain the interactions between biological, physical, and historical processes that produce modern reef environments.
- Explain and distinguish the key mechanisms and characteristics governing the preservation of living communities as fossil assemblages.
- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and

uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.

Fieldwork data and analysis

Due: **During fieldtrip**
Weighting: **23%**

While at Heron Island we will undertake a variety of laboratory practicals and fieldwork. Each of these activities will generate data and students will be required to report data, reflect on the methods used to collect the data, and discuss analyses of the data. Detailed requirements will be provided on an activity by activity basis via iLearn. Individual deadlines will also be set for each activity. All of this work will be completed and submitted while at Heron Island.

On successful completion you will be able to:

- Explain and distinguish the key mechanisms and characteristics governing the preservation of living communities as fossil assemblages.
- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.

Laboratory exam

Due: **During Fieldtrip**
Weighting: **25%**

On the second to last day of the trip students will undertake a comprehensive 2 hour laboratory exam. This comprehensive exam will have written and practical components. The written part typically includes multiple short essay questions that require students to integrate multiple field activities with the broader conceptional frameworks. More detailed information about the exam will be provided on the fieldtrip.

On successful completion you will be able to:

- Explain the interactions between biological, physical, and historical processes that produce modern reef environments.
- Explain and distinguish the key mechanisms and characteristics governing the preservation of living communities as fossil assemblages.
- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.

Independent project report

Due: **Weeks 8 & 12**

Weighting: **25%**

Students will complete the fieldwork and data collection for an independent project while at Heron Island. Students are given substantial freedom to choose the topic for this work, although Health and Safety, Animal Ethics, GBR Marine Park Authority requirements must be met. Students are encouraged to start thinking about the project before going to Heron. Groups of 2 - 4 students are expected to propose a project to the course staff within the first 3 days of the field trip. Groups will then have time to collect the required data and perform preliminary analyses before leaving Heron. *While the data collection is a group activity, each student is expected to write their own report entirely in their own words and without the input from other group members*. Reports will be written following the *instructions to authors* for the journal *Coral Reefs*. Those reports are **due by noon the 3rd of May**. Each student's report will receive two reviews from other students in the class, the goal of the review is to provide **constructive** comments on improving the report. Each student will then revise their report taking into account the reviews they received. Revised reports and a cover letter explaining how the reviews were helpful / addressed are **due by noon on the 31st of May**. More detailed information on the including the marking criteria will be provided via iLearn.

On successful completion you will be able to:

- Explain the interactions between biological, physical, and historical processes that produce modern reef environments.
- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Project report reviews

Due: **Weeks 10 & 12**
Weighting: **11%**

Each student will be assigned two project reports from two other students in the class to review (see project report above). The goal of the review is to provide **constructive** comments on improving the reports. These reviews are **due by noon on May 17th**. See the independent project section on iLearn for additional details.

On successful completion you will be able to:

- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Delivery and Resources

iLearn:

Access to iLearn is required to complete assessment tasks and to access unit resources.

On campus session:

Attendance at both days of the on campus session and for the entirety to the field trip is compulsory. Students who fail to attend the on campus session or to pay the required fee by the due date will forfeit their place in the unit. Any individual anticipating difficulties meeting a due date must discuss and make arrangements with the unit convener well in advance of the due date.

Field trip:

The fieldtrip fee is $850 and must be paid to the University Cashier prior to the census date (on or before March 25th). See iLearn for the payment form. Any student who is unable to pay by this date or for whom the fee is prohibitive should contact the unit convener as extensions or assistance may be possible.

Students are responsible for their own travel arrangements and costs to and from the Gladstone Marina. See Unit schedule section for dates. See: http://www.heronisland.com/Getting-Here.aspx for additional information.

During the field trip students are expected to act in an exemplary manner and follow staff instructions. This is especially true of any requirement imposed by the Heron Island Research Station, Macquarie University Risk and Assurance, Animal Ethics, and/or the Great Barrier Reef Marine Park Authority. Any student who fails to behave as expected will be asked to leave the field trip at their own expense and will be unable to satisfactorily complete the unit.

The field activities are physically strenuous and we will be preparing and eating communal meals. Students must inform the unit staff of any dietary restrictions, food allergies or potential medical issues at (or before) the on campus session so that arrangements can be made (see iLearn). Contact the unit convener and/or technical officer with any concerns.

Any student with special considerations must inform unit staff at or before the on campus session so that accomodations can be organised with campus well being.

Snorkelling:

Staff will make every effort to provide snorkelling opportunities, but snorkelling activities are dependant on weather conditions and participation is dependant student swimming capabilities. The Macquarie University Snorkelling Manual (https://wiki.mq.edu.au/display/unisnorkelling/Snorkelling+Operations+Manual) and the University of Queensland Dive Manual (https://www.uq.edu.au/heron-island-research-station/filething/get/422/divingweb.pdf) will govern our snorkelling activities. During the on campus session students will have the opportunity to undertake a timed 200m swim without fins. Students who 200m in < 5 minutes will likely have more opportunities to snorkel than those swimming 200m in > 5 minutes.

Students are encouraged to practice swimming prior to the on campus session and swim lessons are available through the Macquarie University Swim Program (http://www.mq.edu.au/about/campus-services-and-facilities/sport-and-recreation/swim-school). Student who are concerned about their swimming capabilities should discuss it with the unit convener.

Additional information on what to bring is provided at the on campus session and via iLearn, but appropriate field attire is required and students are strongly encouraged to bring snorkeling equipment.

Unit Schedule

Weeks 1 - 5:

- Complete tasks posted on iLearn. Don't forget to complete the quizzes. They are designed to make sure that you have all the background that will be assumed once you get to Heron! Prepare for the on campus session.
- The **compulsory on campus session** is the second weekend of the session (*March 11th, 9:00 - 17:00, E5A-220 and March 12th TBD [possibly at the Sydney Institute of Marine Science, Chowder Bay]*). Consult iLearn for specifics.
- The field trip fee is due prior to the census date (on or before *March 25th*).
- Begin thinking about potential topics for your independent project. If you want to do a project requiring special equipment it must be sorted out by the census date - please discuss your needs with the course convener with plenty of time.

Week 6:

- Prepare and pack for Heron.

Heron Island Fieldtrip:

- **Typically the fieldtrip is first week of mid semester break, but in 2017 (to avoid Easter) the field trip will be the last week of the session prior to the mid-seamster break.**
- A detailed schedule will be provided via iLearn.
- See the Delivery & Resources / fieldtrip section of this unit guide and iLearn for more information.
- **The fieldtrip is compulsory.**
- You are expected to be at the Gladstone Marina to catch the Ferry departing at *~13:00 on April 8th*.
- You will return on the Ferry arriving at *~13:00 on April 15th*.

Weeks 7 & 8:

- Write up independent project report (see iLearn and additional instructions provided).

Weeks 9 & 10:

- Complete peer review of project reports supplied to you (see iLearn and additional instructions provided).

Weeks 11 & 12:

- Revise your project report based on peer review (see iLearn and additional instructions provided).

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of 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/support/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:

Assessment task

- Independent project report

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 outcome

- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment tasks

- Fieldwork data and analysis
- Independent project report
- Project report reviews

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

- Explain the interactions between biological, physical, and historical processes that produce modern reef environments.
- Explain and distinguish the key mechanisms and characteristics governing the preservation of living communities as fossil assemblages.
- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.
- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment tasks

- On Campus Practical
- Pre-trip online activities
- Fieldwork data and analysis
- Laboratory exam
- Independent project report

- Project report reviews

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

- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.
- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment tasks

- On Campus Practical
- Fieldwork data and analysis
- Laboratory exam
- Independent project report
- Project report reviews

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

- Reconstruct past communities using fossil assemblages. Evaluate the assumptions and uncertainties inherent in these reconstructions.
- Apply and critique field methods in the context of different research goals.
- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results

to a scientific audience.

Assessment tasks

- On Campus Practical
- Pre-trip online activities
- Fieldwork data and analysis
- Independent project report
- Project report reviews

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 outcome

- Design and implement an independent scientific project, analyze and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment tasks

- Fieldwork data and analysis
- Independent project report
- Project report reviews

Changes since First Published

Date	Description
27/01/2017	added disruption to studies as per faculty requirement. Other minor changes to wording.
23/11/2016	Fixed an error in the trip dates.