BIOL379

Reef Evolution and Dynamics

S1 External 2015

Dept of Biological Sciences

Contents

General Information

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Credit points
3

Prerequisites
39cp including (BIOL261 and (BIOL208 or BIOL227 or BIOL262 or MAR202 or GEOS206))

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 one 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:

Develop an understanding of reef structures, organisms, and ecosystems including the interactions between biological, physical, and historical processes in reef environments.
Develop an understanding of how living communities are recorded in fossil assemblages.
Use fossil assemblages to reconstruct past communities, and assess the strengths and weaknesses of the approach.
Learn and apply field methods and teamwork skills.
Design and implement an independent scientific project, analyse and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment Tasks

Name	Weighting	Due
On Campus Practical	5%	2015.Mar.07
Pre-trip online activities	15%	2015.Mar.30
Fieldwork data and analysis	20%	2015.Apr.11
Laboratory exam	25%	2015.Apr.10
Independent project report	25%	2015.May.04 & 2015.Jun.01
Project report reviews	10%	2015.May.18

On Campus Practical

Due: **2015.Mar.07**
Weighting: **5%**

Reefs are biogenic physical structures with a rich and diverse geologic history. Fossil specimens and other material will be provided during the on campus session. Students will use these materials investigate the Phanerozoic history of reefs including changes in taxonomic composition, and the membership of key functional groups through time. The focus of this assessment is the Phanerozoic history of reefs and their associated organisms. An online assessment (accessed via iLearn) will be completed by the students before leaving the on

campus session.

On successful completion you will be able to:

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- Use fossil assemblages to reconstruct past communities, and assess the strengths and weaknesses of the approach.

Pre-trip online activities

Due: **2015.Mar.30**
Weighting: **15%**

A variety of learning resources will be available via iLearn. The goal of these activities is to refresh everyone on 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.

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- Use fossil assemblages to reconstruct past communities, and assess the strengths and weaknesses of the approach.
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- Design and implement an independent scientific project, analyse and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Fieldwork data and analysis

Due: **2015.Apr.11**
Weighting: **20%**

While at Heron Island we will undertake a variety of laboratory workshops and fieldwork. Each of these activities will generate data and students will be required to report data and analyses of these data. Detailed requirements will be provided on an activity by activity basis while in the field. Deadlines will also be set for each activity. All of this work will be completed and submitted while at Heron Island.

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- Use fossil assemblages to reconstruct past communities, and assess the strengths and weaknesses of the approach.
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Laboratory exam

Due: **2015.Apr.10**
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 will include short answer and essay type questions. More detailed information about the exam will be provided at Heron Island.

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Independent project report

Due: **2015.May.04 & 2015.Jun.01**
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 4th of May**. Each student will be assigned two reports from other students of the class to review. Each report will receive two reviews, the goal of the review

is to provide **constructive** comments on improving the report. These reviews are **due by noon on May 18th**. Each student will then revise their report taking into account the constructive feedback they received. Revised reports and a cover letter explaining how the reviews were helpful / addressed are **due by noon on the 1st of June**. More detailed information on the marking criteria will be provided at a later date. See the independent project section on iLearn for additional details.

On successful completion you will be able to:

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

Project report reviews

Due: **2015.May.18**
Weighting: **10%**

Each student will be assigned two project reports from two other students in the class to review. Each student's report will receive two reviews, the goal of the review is to provide **constructive** comments on improving the reports. See the independent project section on iLearn for additional details.

On successful completion you will be able to:

- Develop an understanding of reef structures, organisms, and ecosystems including the interactions between biological, physical, and historical processes in reef environments.
- Design and implement an independent scientific project, analyse and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Delivery and Resources

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

Attendance at the on campus session (March 7th) and for the entirety to the fieldtrip (April 4th - 11th) 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. Deadlines for assignments are not negotiable. Any individual anticipating difficulties meeting a due date must discuss and make arrangements with the unit convenor well in advance of the due date.

Students must submit all assessment tasks to receive a passing mark for the unit.

While data collection and analyses will often be conducted in groups, students are expected 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.

Fieldtrip logistics

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 Health and Safety, 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 fieldtrip fee is $790 and must be paid to the University Cashier by March 23rd. 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.

Students are responsible for their own travel arrangements and costs to and from the Gladstone Marina. The ferry departs the Gladstone Marina at 11:00 on the 4th of April and returns to the marina at approximately 16:00 on the 11th. We recommend students plan to arrive in Gladstone on the 3rd and depart Gladstone on the 12th. See: http://www.heronisland.com/Getting-Here.aspx for additional information.

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.

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

Unit Schedule

Weeks 1 & 2:

Login to iLearn. Do the required activities and reading posted on iLearn and prepare for on campus session. The on campus session is the second Saturday of the session (*March 7th, 8:00 - 17:00, E5A-220*).

Weeks 3 - 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!

The fieldtrip fee is due by Monday of week 5 (*March 23rd*). 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 *March 23rd* - please discuss your needs with the course convenor and tech staff with plenty of time.

Week 6:

Prepare and pack for Heron.

Heron Island Fieldtrip (first week of mid semester break):

A detailed schedule will be provided on the island, but you are expected to be at the Gladstone Marina to catch the Ferry departing at *11:00 on April 4th*. You will return on the Ferry arriving *~16:00 on April 11th*. See the fieldtrip logistics section of this unit guide and iLearn for more information.

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.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use 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

- Learn and apply field methods and teamwork skills.
- Design and implement an independent scientific project, analyse 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
- Independent project report
- Project report reviews

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:

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- Learn and apply field methods and teamwork skills.
- Design and implement an independent scientific project, analyse and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment tasks

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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 outcome

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

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

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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

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interactions between biological, physical, and historical processes in reef environments.
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Assessment tasks

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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

- Develop an understanding of reef structures, organisms, and ecosystems including the interactions between biological, physical, and historical processes in reef environments.
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Assessment tasks

- On Campus Practical

- Pre-trip online activities
- Fieldwork data and analysis
- Laboratory exam
- 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 outcomes

- Learn and apply field methods and teamwork skills.
- Design and implement an independent scientific project, analyse and evaluate the results in the context of the relevant scientific literature, and communicate those results to a scientific audience.

Assessment tasks

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

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:

Assessment task

- Fieldwork data and analysis

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:

Assessment task

- Fieldwork data and analysis