BIOL379

Reef Evolution and Dynamics

S1 External 2014

Dept of Biological Sciences

Contents

General Information

Unit convenor and teaching staff
Tech Staff
Sarah Collison
sarah.collison@mq.edu.au
Contact via sarah.collison@mq.edu.au
E8A322

Unit Convenor
Matthew Kosnik
matthew.kosnik@mq.edu.au
Contact via matthew.kosnik@mq.edu.au
E8A 330

Other Staff
Katherine McClellan
katherine.mcclellan@mq.edu.au
Contact via katherine.mcclellan@mq.edu.au

Credit points
3

Prerequisites
39cp including 6cp from (BIOL208 or BIOL227 or BIOL245 or BIOL261 or MAR201 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%	2014.Mar.08
Online post(s)	10%	2014.Mar.21

Name	Weighting	Due
Fieldwork data and analysis	25%	2014.Apr.18
Laboratory exam	25%	2014.Apr.18
Independent project report	25%	2014.Jun.09
Project report reviews	10%	2014.May.30

On Campus Practical

Due: **2014.Mar.08**
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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Online post(s)

Due: **2014.Mar.21**
Weighting: **10%**

The Great Barrier Reef (GBR) is a geologically recent phenomenon. To explore the Quaternary history of the GBR each student will write a ~ 250 word summary of an assigned chapter from Hopley et al. 2007. *The geomorphology of the Great Barrier Reef: Development Diversity and Change*. [Depending on the number of enrolments additional sources may be used.] In addition to the chapter summary, students will submit an annotated bibliography of 5 to 10 peer-reviewed articles published after 2007 on the same topic area. The annotated bibliography should focus on papers that would be helpful in designing or interpreting potential independent projects. This summary with annotated bibliography must be posted to the discussion forum on iLearn by the 21st of March. Between March 22nd and April 4th each person must post a reply to another student's post commenting on potential areas of overlap, and/or interaction between the two

areas. The focus of this assignment is the Quaternary history of the GBR and also to introduce students to areas for potential independent projects. More information is posted on iLearn.

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Fieldwork data and analysis

Due: **2014.Apr.18**
Weighting: **25%**

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 Research Station.

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Laboratory exam

Due: **2014.Apr.18**
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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- Learn and apply field methods and teamwork skills.

Independent project report

Due: **2014.Jun.09**
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 – 6 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 the 16th 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 May 30th. 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 on the 9th 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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Project report reviews

Due: **2014.May.30**
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:

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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.

Delivery and Resources

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

Attendance at the on campus session (March 8th) and for the entirety to the fieldtrip (April 12th - 19th) 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 $740 and must be paid to the University Cashier by March 31st. See iLearn for the payment form.

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 12th of April and returns to the marina at approximately 16:00 on the 19th. We recommend students plan to arrive in Gladstone on the 11th and depart Gladstone on the 20th. 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).

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

an iCal format unit calendar is acessible from iLearn.

Week 1:

Login to iLearn. Do the required reading posted on iLearn and prepare for on campus session. The on campus session is the first Saturday of the session (March 8th, 9:00 - 16:00, E8A-220).

Weeks 2 - 3:

Preapre your iLearn post summarising your reading assignment and annotated bibliography of references.

Weeks 4 - 5:

The fieldtrip fee is due by March 31st. Comment on other iLearn summary posts and 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 31st - 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:

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 12th. You will return on the Ferry arriving ~ 16:00 on April 19th. See the fieldtrip logistics section of this unit guide and iLearn for more information.

Weeks 7 -9:

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

Weeks 10 - 11:

Peer review reports supplied to you (see iLearn and additional instructions provided).

Weeks 12-13:

Revise your 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/

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/hel

p/.

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

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

- 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
- Online post(s)
- 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

- 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
- Online post(s)
- 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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Assessment tasks

- On Campus Practical
- Online post(s)

- Fieldwork data and analysis
- Laboratory exam
- Independent project report
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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

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Assessment tasks

- On Campus Practical
- Online post(s)
- Fieldwork data and analysis
- Laboratory exam
- Independent project report
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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

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

- Online post(s)
- 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:

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.

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:

Learning outcome

- Learn and apply field methods and teamwork skills.

Assessment task

- Fieldwork data and analysis