BIOL373

Aquatic Ecosystems

S1 Day 2018

Dept of Biological Sciences

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General Information

Unit convenor and teaching staff

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Lecturer
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Credit points
3

Prerequisites
(39cp at 100 level or above) including BIOL227 or ENVS339

Corequisites

Co-badged status

Unit description
This unit introduces the diverse nature of aquatic ecosystems, from catchment to coast, their biota, and the physical and chemical factors that have shaped their structure and function. The unit provides a holistic catchment perspective, covering lakes, rivers, estuaries, and temperate marine communities, fish, invertebrates and ecosystem processes, with a focus on Australian systems. Students will come to understand the key ecological components and processes in aquatic systems, and how ecological knowledge can be applied to management issues. The unit will provide students with experience in environmental monitoring and manipulative experiments, including formulating hypotheses, designing experiments, data collection, analyses, and communication of results. A basic knowledge of statistics is assumed. This unit has a strong emphasis on fieldwork, with essential supporting and contextual knowledge provided by laboratory classes and lectures. This unit helps prepare individuals for employment in aquatic sciences and is beneficial for those continuing to postgraduate studies in aquatic ecology and management.

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:

Describe the characteristics and ecological roles of the major biotic groups in aquatic ecosystems

Identify common invertebrates to the family level

Discuss the ecosystem services provided by aquatic ecosystems and their biota

Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions

Apply various field methods for sampling aquatic biota

Evaluate and address the risks associated with fieldwork in and around water

Analyse data using statistics and present results graphically and in reports

Prepare and edit scientific reports to a professional standard

Assessment Tasks

Name	Weighting	Hurdle	Due
River Ecology Report	35%	No	7/5/18
Report editing & review	5%	No	2-3/5/18
Marine Microcosm experimen	30%	No	Various 23/4-29/5
Class quizzes	20%	No	12/4/18, 6/6/18
Indigenous knowledge reflectio	5%	No	30/5/18, 5/6/18
Attendance at guest lectures	5%	No	various

River Ecology Report

Due: **7/5/18**
Weighting: **35%**

Students will complete a scientific report on a field-based survey of aquatic habitats in the Kangaroo River-Shoalhaven Catchment. Biological data will be collected on the field trip. Students will be expected to identify the invertebrates collected and report on the diversity found and process other samples collected as directed in class. The report will follow the standard format for a professional scientific report, i.e., it will have an abstract/summary, introduction, materials and methods, results and discussion sections and appendices. It will be appropriately referenced. Further details of the assignment requirements will be given in class or online. The report must include the raw data and catchment profile from Prac Wk 4 as an appendix

On successful completion you will be able to:

- Describe the characteristics and ecological roles of the major biotic groups in aquatic ecosystems
- Identify common invertebrates to the family level
- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions
- Apply various field methods for sampling aquatic biota
- Evaluate and address the risks associated with fieldwork in and around water
- Analyse data using statistics and present results graphically and in reports
- Prepare and edit scientific reports to a professional standard

Report editing & review

Due: **2-3/5/18**
Weighting: **5%**

Reviewing the work of others is an important part of scientific writing and research. Students will bring to class a hard copy of their completed scientific report. These will be distributed among the class and each student will edit and review the work of another. Submissions will be anonymous. You will receive the feedback and comments made by your classmates who have reviewed your work.

On successful completion you will be able to:

- Prepare and edit scientific reports to a professional standard

Marine Microcosm experimen

Due: **Various 23/4-29/5**
Weighting: **30%**

The marine microcosms set up in week 2 will be used in a BACI experimental setup that will be designed by the students during the first 4 weeks of the session. Student groups will be responsible for monitoring the microcosms daily for the duration of the session. Three assessment tasks will be based on this semester long project. 1. Hypotheses and methods: where students propose their experimental design / manipulation and suggest what outcomes are expected. 2. Data collection over the course of the session. 3. A short report on the results of the experiment.

On successful completion you will be able to:

- Describe the characteristics and ecological roles of the major biotic groups in aquatic

ecosystems
- Identify common invertebrates to the family level
- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions
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- Prepare and edit scientific reports to a professional standard

Class quizzes

Due: **12/4/18, 6/6/18**
Weighting: **20%**

In-class quizzes

A quiz will be held during class time. The quiz will cover all material from prac classes, lectures and online learning activities given prior to the quiz date.

On successful completion you will be able to:
- Describe the characteristics and ecological roles of the major biotic groups in aquatic ecosystems
- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions

Indigenous knowledge reflectio

Due: **30/5/18, 5/6/18**
Weighting: **5%**

Attendance at indigenous knowledge lecture and preparation of short reflective statement following the in class workshop.

On successful completion you will be able to:
- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions

Attendance at guest lectures

Due: **various**
Weighting: **5%**

Attendance at five guest lectures. Marked as pass/fail based on attendance for whole lecture. Guest lectures are those highlighted in bold in the lecture schedule above. Students will receive 1 mark for each guest lecture attended up to a maximum of 5 marks.

On successful completion you will be able to:

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- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions
- Evaluate and address the risks associated with fieldwork in and around water

Delivery and Resources

Timetable

Lecture	Tuesday	9 am – 10 am	9 Wallys Wlk - 133
Lecture	Wednesday	9 am – 10 am	25a Wallys Wlk – 207
Practical session	Wednesday	2 pm – 5 pm	14 Eastern Rd - 160
Practical session	Thursday	9 am – 12 pm	14 Eastern Rd - 160

Compulsory overnight field trip 27-29 March 2018

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). 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). 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).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Assessment task

- Indigenous knowledge reflectio

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

- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions
- Apply various field methods for sampling aquatic biota
- Evaluate and address the risks associated with fieldwork in and around water
- Analyse data using statistics and present results graphically and in reports
- Prepare and edit scientific reports to a professional standard

Assessment tasks

- River Ecology Report
- Report editing & review

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:

Assessment tasks

- Class quizzes
- Attendance at guest lectures

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

- Describe the characteristics and ecological roles of the major biotic groups in aquatic ecosystems
- Identify common invertebrates to the family level
- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions
- Apply various field methods for sampling aquatic biota
- Evaluate and address the risks associated with fieldwork in and around water

Assessment tasks

- River Ecology Report
- Marine Microcosm experimen
- Class quizzes
- Attendance at guest lectures

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

- Discuss the ecosystem services provided by aquatic ecosystems and their biota
- Identify physical, chemical, and biotic factors in oceans, estuaries, rivers, streams, lakes, and aquifers that influence biota and ecosystem functions
- Evaluate and address the risks associated with fieldwork in and around water
- Analyse data using statistics and present results graphically and in reports
- Prepare and edit scientific reports to a professional standard

Assessment tasks

- River Ecology Report
- Report editing & review
- Marine Microcosm experimen
- Indigenous knowledge reflectio

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

- Evaluate and address the risks associated with fieldwork in and around water
- Analyse data using statistics and present results graphically and in reports
- Prepare and edit scientific reports to a professional standard

Assessment tasks

- River Ecology Report
- Marine Microcosm experimen

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

- Analyse data using statistics and present results graphically and in reports
- Prepare and edit scientific reports to a professional standard

Assessment tasks

- River Ecology Report
- Report editing & review
- Indigenous knowledge reflectio

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

- Indigenous knowledge reflectio

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

- River Ecology Report