



# ENVS703

## Science in Environmental Management

S1 Evening 2018

*Dept of Environmental Sciences*

### Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Unit Schedule</u>	8
<u>Policies and Procedures</u>	9
<u>Graduate Capabilities</u>	11
<u>Changes from Previous Offering</u>	13

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## General Information

### Unit convenor and teaching staff

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### Credit points

4

### Prerequisites

Admission to MRes

### Corequisites

### Co-badged status

ENV5703 with ENV5803

### Unit description

The aim of this unit is to provide understanding of how environmental science influences management and decision making. The unit introduces students to the major chemical, physical and ecological processes that effect and control natural and anthropogenic environmental impacts. In this unit the disciplinary concerns and environmental principles within geoscience, ecology and environmental chemistry are explored and linkages among these disciplines emphasised from the viewpoint of science.

## 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:

Understand the scientific methodology and its application to analysing and managing environmental problems.

Be able to critically review peer-reviewed scientific literature that deals with environmental science problems.

Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.

Develop skills in both individual research and working in groups.

Apply scientific knowledge to develop realistic strategies for dealing with complex environmental problems.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Literature review</a>	30%	No	9 April 2018
<a href="#">Learning Exercises</a>	30%	No	Variable
<a href="#">Research Project</a>	40%	No	29 May 2018

### Literature review

Due: **9 April 2018**

Weighting: **30%**

This assessment requires students to independently undertake a review of the literature on a topic within one of the environmental sciences disciplines. The aim of the review is to **evaluate how science has informed or influenced environmental management for that topic**.

Scientific papers can be pretty daunting at first but this is the form in which original research first appears. Primary scientific references describe the rationale for the investigation, the approaches, methods and the findings. Secondary references are a step removed from the original work and include review articles. Your **review article** must include **at least 12 peer reviewed scientific papers** that are relevant to your topic.

You are encouraged to look critically at the scientific data. In the first lecture you will learn about the nature of science and why scientific experiments can be so difficult to carry out.

The experimental design and execution inevitably has many shortcomings and if you come to appreciate the inherent difficulties you will be better equipped to spot weaknesses in published research.

In the first Scientific Writing Skills Workshop (Literature reviews) you will learn how to structure your review and how to present your critical analysis of the literature. The **maximum length for this assessment is 2000 words**, excluding tables, graphs and reference list.

**This assessment is worth 30 marks**, or 30 % of the unit grade. A summary breakdown of the marks is shown in the table below and further details will be provided in the first lecture.

Late penalties: Extensions will only be granted for exceptional circumstances (which does not include workload or computer problems) and with prior permission by submitting a request through [ask.mq.edu.au](http://ask.mq.edu.au). Unapproved late submissions will attract a 10% per day penalty.

**Criterion Weighting** Introduction, including aims, scope and significance of the review 5  
Critical analysis of the literature and conclusions 15 Presentation and structure 10 **Total 30**  
On successful completion you will be able to:

- Be able to critically review peer-reviewed scientific literature that deals with environmental science problems.
- Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.
- Develop skills in both individual research and working in groups.

## Learning Exercises

Due: **Variable**

Weighting: **30%**

Each of the three modules in the unit includes a learning exercise that students must complete in their own time and submit by the relevant due date shown below. The learning exercises are designed to build on the lectures and in-class activities, thereby enhancing the learning process. **Each exercise is worth 10 marks**, with a combined total of 30 marks or 30% of the unit grade.

Assessment due dates:

**Geoscience: Mon 26 March 2018**

**Ecology: Mon 16 April 2018**

**Coastal & Marine Science: Mon 21 May 2018**

Late penalties: Extensions will only be granted for exceptional circumstances (which does not include workload or computer problems) and with prior permission by submitting a request through [ask.mq.edu.au](http://ask.mq.edu.au). Unapproved late submissions will attract a penalty of 0.5 marks per day after the due date, and no exercise will be accepted one week after the due date.

On successful completion you will be able to:

- Understand the scientific methodology and its application to analysing and managing

environmental problems.

- Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.
- Develop skills in both individual research and working in groups.

## Research Project

Due: **29 May 2018**

Weighting: **40%**

After the mid-semester break, students will be assigned to groups of ~4 to undertake **research on a topic related to the science of climate change, its impacts and management strategies**.

Each group will need to meet outside of the scheduled classes to decide on their topic, allocate research tasks, collate material and develop the final presentation.

Marks: This assignment is composed of three parts:

1. **Research Abstract**, which must be completed by each student individually, **worth 10 marks**, or 10 % of the total unit grade
2. **Oral presentation of research findings**, which will be undertaken in groups; **worth 20 marks**, or 20 % of the total unit grade.
3. **Participation in research**, which will be assessed individually during the presentations; **worth 10 marks**, or 10 % of the total unit grade.

The abstract, which needs to be completed individually, should include a brief yet informative title describing the research, the authors name, affiliation and be a **maximum of 500 words**.

Hints on how to write a good abstract will be provided in the Scientific Writing Skills Workshop: Abstracts

For the presentation, groups will be allocated **5 minutes per participant in the group + 10 minutes for questions** (i.e. groups containing 3 participants will have 15 minutes for the presentation, while those with 4 participants will have 20 minutes time for presentations). Groups will give their presentations to the rest of the class. You may use any presentation format you like: lecture, seminar, poster, role-play, video etc. Groups will be allocated a single mark of up to 20% of the total mark for the teamwork presentation, which will be assessed according to the criteria below. All members of the group must play an active part in either preparation of the material or its presentation.

### Criterion

#### Weighting

Content and quality of the research

8 Presentation structure, design and effectiveness 4

Visual aids (slides or other)

## Answers to questions

### 4 **Total 20**

Each group member will receive an additional mark of up to 10% of the total mark for individual participation in the preparation, delivery and question-answer parts of the presentation, in accordance with the follow criteria.

**Criterion Weighting** Communication and delivery 5 Participation in the presentation, questions and discussion 5 **Total 10**

On successful completion you will be able to:

- Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.
- Develop skills in both individual research and working in groups.
- Apply scientific knowledge to develop realistic strategies for dealing with complex environmental problems.

## Delivery and Resources

### Learning activities

The unit is comprised of 13 weeks of classes which will be held on **Tuesday evenings in 11 Wally's Walk, Tutorial Room 140, from 6-9 pm**. The format of the classes varies, and includes lectures from academic staff on geoscience, ecology and coastal & marine science; two writing skills workshops and a lab skills workshop; and 1-2 weeks of student presentations. Each class also features interactive activities as well as class discussion, particularly during the presentations. As a result, it is essential that students attend each class. This unit is not able to be offered externally.

In addition to the scheduled classes, students are also required to spend time doing their own independent reading and research, with most of this time going towards completing the assessments. As a guide, students should aim to spend approximately 100-120 hours of their own time on the unit over the semester, in addition to the 3 hour class each week.

### Requirements to Complete this Unit Satisfactorily

Students must submit all assignments, attend the group presentations and gain a final mark of at least 50% to complete this unit satisfactorily.

Students are required to attend at least 80% of the scheduled classes, and will be asked to sign an attendance sheet. Attendance may be taken into account when assigning final grades for the unit where marks are on the border between one grade and the next.

### Technologies Used and Required

Students will need to **bring a computer to class for the weeks that are identified as**

**Scientific Writing Skills Workshops (Week 2 and 11).** In these weeks, we will use basic programs such as Word and Excel.

For the **Lab Skills Workshop (Week 5)**, **students must wear closed shoes** to be permitted to work in the lab.

Students will also need to have access to a computer to use the university systems (e.g. iLearn, library) and complete the assessment tasks. Submissions of the assessment tasks will be arranged through iLearn using Turnitin. Academic search engines (ISI Web of Knowledge and Scopus) and submission of the assessment tasks will be discussed during the first night of the class.

### **Recommended Texts/Materials**

There is no single text for this course.

*Background reading can be found in the following:*

Aplin, G (2002), *Australians and their Environment: An Introduction to Environmental Studies*, Oxford University Press

Arms K (1994). *Environmental Science*, Saunders College Publishing, Fort Worth, 2nd edition.

Australian State of the Environment Committee (2006). *Australia: State of the Environment 2006*.

Independent report to the Commonwealth Minister for Environment and Heritage.  
CSIRO Publishing on behalf of the Department of Environment and Heritage, Canberra.

Beckmann R (1994). *Environmental Science*, Australian Academy of Science, Canberra.

Enger ED and Smith BF (2006). *Environmental Science: a study of interrelationships*, McGraw Hill Publish.

Huxham M and Sumner D (2000). *Science and Environmental Decision Making*, Pearson Education.

Munasinghe M and Swart R (2005). *Primer on Climate Change and Sustainable Development*, Cambridge University Press.

O'Riordan T (ed) (1995). *Environmental science for environmental management*, Longman House, Harlow.

### *Geosciences source books*

Brierley G.J. & Fryirs K.F. (2005) *Geomorphology and River Management: Applications of the River Styles Framework*, Blackwell Publishing, Oxford, UK. GB1203.2.B755/2005

Cooke R.U. & Doornkamp J.C. (1990). *Geomorphology and Environmental Management*, 2nd edition, Clarendon Press, Oxford. GB406.C64/1990

Jacobson M.C. (2000). Earth System Science: From Biogeochemical Cycles to Global Change. Academic Press, London. QH344.E17/2000

Marchetti M. & Rivas V. (2001). Geomorphology and Environmental Impact Assessment.

Balkema, Lisse. GB406.G46 Press F. & Siever R. (1998) Understanding Earth. Freeman, New York. QE28.P9/1998

Slaymaker, O. (2000). Geomorphology, Human Activity, and Global Environmental Change. Wiley, Chichester. GE149.G46/2000

Summerfield, M.A. (1991) Global Geomorphology, Longman Publishers, Singapore. GB401.5.S84

### *Ecology source books*

Begon M, Mortimer M and Thompson DJ (1996). Population Ecology: a Unified Study of Animals and Plants, Blackwell, Oxford, 3rd edition.

Burgman, M. and Lindenmayer, D. (1998): Conservation Biology for the Australian Environment. Surrey Beatty & Sons, Sydney

Krebs CJ (2001). Ecology: the Experimental Analysis of Distribution and Abundance, Harper, New York, 5th edition. Magurran, A. E. 2004. Measuring Biological Diversity. Blackwell Science, Massachusetts, 1st ed.

Townsend, C. R., Harper, J. and Begon, M. (2000) Essentials of Ecology, Blackwell Science, Massachusetts, 1st ed.

### *Journal Articles*

Use of ISI Web of Knowledge or Scopus to search and access scientific literature published in peer-reviewed journals.

## Unit Schedule

Week	Date*	Topics	Lecturer	Assignment due dates
1	27/2	Introduction to Environmental Science  What is science? Introduction to Scientific Method and Practice	K. Tomkins	
2	6/3	Scientific Writing Skills Workshop: Literature Reviews	K. Tomkins	
3	13/3	Geoscience basic concepts	K. Tomkins	



4	20/3	Geoscience in Environmental Management: some examples	K. Tomkins	
5	27/3	Scientific Lab Skills Workshop: Water Quality Analysis	S. Wilson	Exercise 1 – Geoscience Mon 26 March
6	3/4	Ecology: basic concepts	K. Lee	
7	10/4	Ecology in Environmental Management: some examples	K. Lee	Literature review – Mon 9 April
		<b>MID SEMESTER BREAK</b>		Exercise 2 - Ecology Mon 16 April
8	1/5	Coastal & Marine Science: basic concepts	N. Saintilan	
9	8/5	Coastal Science in Environmental Management: some examples	N. Saintilan	
10	15/5	Coastal Science in Environmental Management: cont.	E. Ens	
11	22/5	Scientific Writing Skills Workshop: Abstracts	K. Lee	Exercise 3 – Coastal & Marine Science Mon 21 May
12	29/5	Group Project Presentations	K. Lee	Abstract, presentations and participation – Tues 29 May
13	5/6	Group Project Presentations	K. Lee	Presentations and participation cont.

\*Tues 6-9 pm, 11 Wally's Walk - 140 tutorial room

## 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](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://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](http://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](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)

## 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

### PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

#### Learning outcomes

- Develop skills in both individual research and working in groups.
- Apply scientific knowledge to develop realistic strategies for dealing with complex environmental problems.

#### Assessment task

- Research Project

### PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

#### Learning outcomes

- Understand the scientific methodology and its application to analysing and managing environmental problems.
- Be able to critically review peer-reviewed scientific literature that deals with environmental science problems.
- Apply scientific knowledge to develop realistic strategies for dealing with complex environmental problems.

#### Assessment tasks

- Literature review
- Learning Exercises
- Research Project

### PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience,

of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

### **Learning outcomes**

- Understand the scientific methodology and its application to analysing and managing environmental problems.
- Be able to critically review peer-reviewed scientific literature that deals with environmental science problems.
- Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.
- Develop skills in both individual research and working in groups.

### **Assessment tasks**

- Literature review
- Learning Exercises
- Research Project

## **PG - Research and Problem Solving Capability**

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

### **Learning outcomes**

- Be able to critically review peer-reviewed scientific literature that deals with environmental science problems.
- Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.
- Apply scientific knowledge to develop realistic strategies for dealing with complex environmental problems.

### **Assessment tasks**

- Literature review
- Learning Exercises
- Research Project

## PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

### Learning outcomes

- Develop skills in synthesising information on environmental science research, and presenting it in written, oral and visual forms.
- Develop skills in both individual research and working in groups.

### Assessment tasks

- Literature review
- Research Project

## PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

### Learning outcomes

- Be able to critically review peer-reviewed scientific literature that deals with environmental science problems.
- Apply scientific knowledge to develop realistic strategies for dealing with complex environmental problems.

### Assessment task

- Research Project

## Changes from Previous Offering

Due to a change in staff in the unit, the module on Environmental Chemistry has been changed to Coastal & Marine Science.