



ENVS803

Science in Environmental Management

S1 Evening 2019

Dept of Environmental Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</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>	14

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General Information

Unit convenor and teaching staff

Convenor

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Professor

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Credit points

4

Prerequisites

Admission to MEnv or MEnvEd or MEnvMgt or MEnvStud or MEnvPlan or MPlan or MSusDev or MSc or MWldMgt or MMarScMgt or GradCertEnv or GradDipEnv or GradCertSusDev or GradDipSusDev or MConsBiol or MScInnovation

Corequisites

Co-badged status

ENV5703

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.

General Assessment Information

This unit is an introductory unit that is best suited to students who are new to science, new to environmental management, or wish to develop a better understanding of the natural environment and the complexity of environmental issues. The content and assessments are scaffolded so that students develop the basic knowledge and skills across a range of environmental disciplines.

Assessment Tasks

Name	Weighting	Hurdle	Due
Literature review	30%	No	28 April 2019
Learning Exercises	30%	No	Variable
Research Project	40%	No	4 June 2019

Literature review

Due: **28 April 2019**

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 **examine the scientific knowledge on that topic and evaluate how it has been used to inform management of the environment**.

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 **word limit for this assessment is 1500 words**, excluding any tables, graphs and the 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. Unapproved late submissions will attract a penalty of 1.5 marks per day.

Criterion Weighting Introduction, including aims 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%**

The unit includes three learning exercises 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, field trip and workshops, 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:

Field trip observations: Tues 19 March 2019

Stream health assessment: Tues 16 April 2019

Environmental chemistry questions: Tues 21 May 2019

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

Research Project

Due: **4 June 2019**

Weighting: **40%**

In Week 8, 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**. While some time has been allocated in the unit schedule for this assessment (Weeks 8 and 11), each group will also need to meet outside of the scheduled classes to undertake the research, collate the 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. **Group oral presentation of the research aims and findings** in Week 13; **worth 20 marks**, or 20 % of the total unit grade.
3. **Participation in the research and presentation**, 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 300 words**. Hints on how to write a good abstract will be provided in the Scientific Writing Skills Workshop on Abstracts

For the presentations, groups will be allocated a **maximum time of 20 minutes each, including questions**, pro-rated for smaller or larger groups. You may use any presentation format you like: lecture, seminar, poster, role-play, video etc. Groups will be allocated a single mark out of 20 for the presentation, which will be assessed according to the criteria below. All members of the group must play an active part in the research and presentation.

Criterion

Weighting

Content and quality of the research

10 Presentation structure, design and effectiveness 4

Visual aids (slides or other)

4

Answers to questions

2 Total 20

Each group member will receive an additional mark out of 10 for their 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**

Late penalties: Extensions for the abstracts will only be granted for exceptional circumstances and with prior permission by submitting a request through ask.mq.edu.au. Unapproved late submissions will attract a penalty of 0.5 marks per day after the due date. Participation in the group presentations is compulsory. If a student cannot present because of extenuating circumstances, such as serious illness supported by a medical certificate, the student will give their presentation to the unit convenor at a later date. If a student does not present and does not have a well supported reason, they will receive zero marks for the group presentation and participation.

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

Delivery and Resources

Learning activities

The unit is comprised of 10 weeks of classes which will be held on **Tuesday evenings in 6 Eastern Road (E4B), Room 314, from 6-9 pm**. The format of the classes varies and includes lectures from academic staff, two writing skills workshops, two lab skills workshops (location to be advised), a weekend field trip, and 1 week of student 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 scheduled classes.

Field trip - Saturday 16 and Sunday 17 March

The unit includes a weekend field trip to Katoomba in the Blue Mountains, which is home to the

famous Three Sisters, and provides easy access to the Blue Mountains World Heritage area. Katoomba is the largest centre in the Blue Mountains, with a population of ~8000 people. Each year, the region receives over 4 million visitors with most of these stopping at Katoomba. As a result, the area is an ideal place to learn about the natural environment and environmental management. Students will visit different sites to observe environmental management issues and collect water quality samples for subsequent analysis in the lab in Weeks 5 and 6.

Note: The cost of the field trip is not covered by the unit fees. Students will need to pay for transport to/from and around Katoomba either by driving or by catching the train (~\$8 each way, plus extra for the Blue Mountains Explorer bus). Students have the option of staying in Katoomba on the Friday and/or Saturday night or travelling up/back each day. There are several options for accommodation in Katoomba - the cheapest and best option is to stay at the Katoomba YHA which also has some great package deals for less than \$100: <https://www.yha.com.au/hostels/nsw/blue-mountains/katoomba/specials/> A visit to Scenic World is also planned. Logistics will be discussed during the 1st week of class.

Requirements to Complete this Unit Satisfactorily

Students must submit all assignments 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, including the field trip and Week 13 presentation, and will be asked to sign an attendance sheet. Permission not to attend will only be granted in exceptional circumstances including avoidable clashes with other units. 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.

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.

Field and Lab Work, Health and Safety

For the **Field Trip** (end Week 3), students **must wear/bring appropriate clothing and bring adequate water and food** for each day. Further details will be provided in Week 1.

For the **Lab Skills Workshops** (Week 5 and 6), students **must wear closed shoes** to be permitted to work in the lab.

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.

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

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.

Journal Articles

Scientific literature published in peer-reviewed journals can be sourced using a number of search engines: Google Scholar, ISI Web of Knowledge or Scopus. Most journals will require you to be connected to the university library system first to enable access using the university subscriptions.

Unit Schedule

Week	Date	Topics and Assessment due dates
1	26/2	Introduction to Environmental Science (KT)
2	5/3	Scientific Writing Skills Workshop: Literature Reviews (KT)
3	12/3	Introduction to Environmental Management Issues (KT & SW)
3	16-17/ March	Weekend field trip - Blue Mountains (KT & SW)
4	19/3	No class - In lieu of the field trip. Exercise 1 due.

5	26/3	Scientific Lab Skills Workshop: Water quality analysis (lab) (SW)
6	2/4	Scientific Lab Skills Workshop: Macroinvertebrates (lab) (SW)
7	9/4	Stream Health Assessment (SW)
BREAK		Exercise 2 due Tues 16 April. Literature review due Sun 28 April
8	30/4	Informal class – Commence working on your research project (KT)
9	7/5	Environmental Chemistry: basic concepts (VS)
10	14/5	Environmental Chemistry in Environmental Management: some examples (VS)
11	21/5	No class – Work in groups on your research project. Exercise 3 due.
12	28/5	Scientific Writing Skills Workshop: Abstracts (KT)
13	4/6	Group Project Presentations, and abstracts due (KT)

Staff: KT – Dr Kerrie Tomkins, SW – Dr Scott Wilson, VS – Professor Vlad Strezov

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

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 published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@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

If you are a Global MBA student contact globalmba.support@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

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

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

As a result of student feedback via LEU's, a 2-day field trip has been introduced into the unit for the first time in 2019.