



ENVS705

Air and Water Quality

S2 Evening 2017

Dept of Environmental Sciences

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General Information

Unit convenor and teaching staff

Unit convenor

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Lecturer

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Lecturer

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Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

ENV5805 Air and Water Quality

Unit description

This unit focuses on the chemical and physical aspects of air and water pollution. The aims of the unit are to show how a number of major chemical pollutants are released into the environment, how they react, move and impact the environment and human health. The presentation is set in a context of the science and management of air and water quality. The unit includes treatment of problems in air pollution, global atmospheric change, water pollution and the water resources of Australia.

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 language and fundamental principles of air and water quality science.

Interpret raw data in environmentally significant terms.

Appreciate the uncertainty of the air and water quality data and specialist outputs such as air and water quality models.

Define the content and scope of air and water quality problems.

Define air and water quality management problems in scientific terms.

Locate sources of air and water quality information.

Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Assessment Tasks

Name	Weighting	Hurdle	Due
Air quality exercise	20%	No	Week 7
Critical literature reiew	40%	No	Week 9
Fieldtrip journal	20%	No	Week 11
Environmental assessment	20%	No	Week 13

Air quality exercise

Due: **Week 7**

Weighting: **20%**

A take home exercise will be distributed in Week 5, due for submission in Week 7. The exercise will comprise of several questions concerning environmental modelling, pollutant distribution, interpretation of the data and short essay answers.

On successful completion you will be able to:

- Understand the language and fundamental principles of air and water quality science.
- Interpret raw data in environmentally significant terms.
- Appreciate the uncertainty of the air and water quality data and specialist outputs such as air and water quality models.
- Define the content and scope of air and water quality problems.

Critical literature reiew

Due: **Week 9**

Weighting: **40%**

The assignment will consist of 4,000 words of a critical review of one of a range of set subjects. The review should be performed using scientific search tools for collection of relevant scientific

and professional literature. The assignment should assess and evaluate the scientific materials within an environmental management perspective.

On successful completion you will be able to:

- Understand the language and fundamental principles of air and water quality science.
- Interpret raw data in environmentally significant terms.
- Define the content and scope of air and water quality problems.
- Define air and water quality management problems in scientific terms.
- Locate sources of air and water quality information.
- Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Fieldtrip journal

Due: **Week 11**

Weighting: **20%**

An overview of the problems encountered and solutions applied by Hornsby City Council in the sites visited during the fieldtrip. The answers should give a detailed outline of the engineering concepts applied by the Council, as outline during the water quality lectures.

On successful completion you will be able to:

- Define air and water quality management problems in scientific terms.
- Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Environmental assessment

Due: **Week 13**

Weighting: **20%**

Following a fieldtrip to a Sydney chicken farm, the assessment task will involve evaluating a NSW EPA Licence for a Sydney chicken farm with respect to the measurement of environmental impacts, monitoring and its capacity to capture accurately any offsite impacts from the agricultural use. Students will have the opportunity to visit the site, assess the licence, collect preliminary field data/observations, review available published data for the facility and then to draft a mock submission to the EPA about the 'fit for purpose' nature of the existing licence.

On successful completion you will be able to:

- Define the content and scope of air and water quality problems.
- Locate sources of air and water quality information.
- Write clear and cogent reports, assessing air and water quality matters for management

and public audiences.

Delivery and Resources

There is no set text for this unit. The following lists some useful references.

A. Specialist texts

Bunce N 1994 Environmental Chemistry Wuerz, Winnipeg.

Harrison RM 1999 Understanding our Environment: An Introduction to Environmental Chemistry and Pollution (3rd ed.) Royal Society of Chemistry, London.

Manahan SE 1999 Environmental Chemistry (7th ed.), Lewis, Chelsea.

O'Neill P Environmental Chemistry.

Stoker HS & Seager SL Environmental Chemistry: Air and Water Pollution, (2nd ed).

vanLoon GW and Duffy SJ 2000 Environmental Chemistry - a global perspective.

B. State of Environment report

State of the Environment Reports 1996, 2001, 2006 & 2011 published by the Department of Sustainability, Environment, Water, Population and Communities are key resources which summarise many of the important issues which will be treated in this course, and also contains a comprehensive bibliography in many of the areas.

Web site <http://www.environment.nsw.gov.au/>

C. Books

Boyd CE, 2000 Water Quality: An Introduction, Kluwer Academic Publishers.

Connell DW 1993 Water Pollution: Causes and Effects in Australia and New Zealand 3rd ed. Uni Qld Press, Brisbane.

Laws E.A 1993 Aquatic Pollution: An Introductory Text 2nd edition John Wiley.

Pigram J. J 1986 Issues in the Management of Australia's Water Resources Longman, Melbourne.

Smith DI 1998 Water in Australia: resources and management Oxford, Melbourne.

Stensel D, Tchobanoglous G & Burton FL 2002 Wastewater Engineering: Treatment and Reuse, Metcalf & Eddy McGraw Hill, New York.

Williams W.D. (ed.) An Ecological Basis for Water Resource Management. American Public Health Association 1995 Standard Methods for the Examination of Water and Wastewater (19 ed.) APHA, AWWA, WPCF, Washington.

Australian and New Zealand Environment and Conservation Council 1992 Australian Water Quality.

Guidelines for Fresh and Marine Waters ANZECC, Canberra. Australian and New Zealand Environment and Conservation Council 2000.

Australian Water Quality Guidelines for Fresh and Marine Waters ANZECC, Canberra.

Brimblecombe, P. 1996. Air Composition and Chemistry, Cambridge Environmental Chemistry Series.

Seinfeld, J.H. 2006. Atmospheric Physics and Chemistry of Air Pollution, Wiley.

Jacobson, M.Z. 2002. Atmospheric pollution: history, science, and regulation, Cambridge University Press, New York.

Unit Schedule

Date	Subject	Lecturer
1 August	Introduction to unit Introduction to air pollution	V. Strezov
8 August	Combustion Air toxics	V. Strezov
15 August	Air pollution and meteorology Atmospheric dispersion modelling	V. Strezov
22 August	Particles Vehicle emissions	M. Taylor
29 August	Photochemical smog Acid deposition	V. Strezov
5 September	Urban water quality Aquatic ecosystem impacts and assessment	R. McPherson
12 September	Water quality monitoring Water quality indicators	R. McPherson
MID SEMESTER BREAK		
3 October	Water quality treatment Stormwater and sewage	R. McPherson
10 October	Water cycle management Water sensitive urban design	R. McPherson
17 October	Fieldtrip to Hornsby council constructed wetland, bioretention treatment and stormwater treatment sites	R. McPherson and V. Strezov

24 October	Environmental policies Environmental licencing	R. McPherson
31 October	Fieldtrip to Sydney chicken farm	M. Taylor and V. Strezov
7 November	Assessments due	(no class)

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_2016.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

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://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

- Define air and water quality management problems in scientific terms.
- Locate sources of air and water quality information.
- Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Assessment task

- Environmental assessment

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 language and fundamental principles of air and water quality science.
- Interpret raw data in environmentally significant terms.
- Appreciate the uncertainty of the air and water quality data and specialist outputs such as air and water quality models.
- Define the content and scope of air and water quality problems.
- Define air and water quality management problems in scientific terms.
- Locate sources of air and water quality information.

Assessment tasks

- Air quality exercise
- Critical literature review
- Fieldtrip journal
- Environmental assessment

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 language and fundamental principles of air and water quality science.
- Interpret raw data in environmentally significant terms.
- Appreciate the uncertainty of the air and water quality data and specialist outputs such as air and water quality models.
- Define the content and scope of air and water quality problems.

Assessment tasks

- Critical literature review
- Environmental assessment

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

- Interpret raw data in environmentally significant terms.
- Appreciate the uncertainty of the air and water quality data and specialist outputs such as air and water quality models.
- Define the content and scope of air and water quality problems.
- Locate sources of air and water quality information.

Assessment tasks

- Air quality exercise
- Critical literature review

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

- Define the content and scope of air and water quality problems.
- Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Assessment tasks

- Critical literature review
- Fieldtrip journal
- Environmental assessment

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

- Define air and water quality management problems in scientific terms.
- Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Assessment tasks

- Fieldtrip journal
- Environmental assessment