



ENVS705

Air and Water Quality

S2 Evening 2019

Dept of Environmental Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	5
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	7
<u>Graduate Capabilities</u>	8

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General Information

Unit convenor and teaching staff

Unit convenor

Vladimir Strezov

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12WW 5.10

Lecturer

Scott Wilson

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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
Fieldtrip journal	20%	No	Week 6
Water quality analysis report	30%	No	Week 8
Air quality exercise	20%	No	Week 12
Impact Assessment	30%	No	Week 13

Fieldtrip journal

Due: **Week 6**

Weighting: **20%**

This assessment task will consist of a fieldtrip journal to summarise the problems encountered and solutions applied for the sites visited during the Week 4 fieldtrip. This assessment should be written in 1000 words, excluding title page, any tables, figures and references used.

On successful completion you will be able to:

- Understand the language and fundamental principles of air and water quality science.
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- 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.

Water quality analysis report

Due: **Week 8**

Weighting: **30%**

The assignment will consist of analysis of water quality from the Week 7 fieldtrip and Week 8 laboratory analysis. The assignment should be prepared as a short consulting report to present the state of water and sediment quality for the site visited during the fieldtrip. The assignment is limited to 1,500 words excluding title page, abstract, tables, figures and references.

On successful completion you will be able to:

- Understand the language and fundamental principles of air and water quality science.
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- Locate sources of air and water quality information.
- Write clear and cogent reports, assessing air and water quality matters for management and public audiences.

Air quality exercise

Due: **Week 12**

Weighting: **20%**

A take home exercise will be distributed in Week 10, due for submission in Week 12. 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.

Impact Assessment

Due: **Week 13**

Weighting: **30%**

Students will be grouped to work on a project for impact assessment of industrial activities on air and water quality using the impact assessment modelling tools learnt during Week 11. The students will be grouped in Week 8 and will be assigned group topics. The assignment will consist of 3,000 word group report, which will be marked 20 out of 30 and a one page of individual contribution submitted by each group member, which will be used to assess individual participation in the group project and contribute to 10 out of 30 for the mark. The 3,000 word assignment should be prepared in an original research paper format, as outlined in Week 11.

On successful completion you will be able to:

- 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.

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. Reports

Goedkoop, M. et al. ReCiPe A life cycle impact assessment method which comprises harmonised category indicators at the midpoint and the endpoint level, 2009

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://soe.environment.nsw.gov.au/>

Simpson, S.L. et al. Handbook for Sediment Quality Assessment, CSIRO, Lucas Heights, Australia, 2005.

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.

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

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 Air and water quality research trends	V. Strezov
8 August	Urban water quality	S. Wilson
15 August	Stormwater, sewage and water quality cycle	S. Wilson
22 August (9am - 4pm)	Fieldtrip 1 - Drinking water quality and urban water quality	V. Strezov
27 August	Water quality monitoring and assessment	V. Strezov
5 September (9am - 4pm)	Fieldtrip 2 - Water quality sampling and measurements	V. Strezov
12 September	Water and sediment quality laboratory analysis	V. Strezov
MID SEMESTER BREAK		
3 October	Combustion and air toxics	V. Strezov
10 October	Particles, photochemical smog and acid deposition	V. Strezov
17 October	Air pollution meteorology and dispersion	V. Strezov
24 October	Impact assessment of industrial activities on air and water quality	V. Strezov
31 October	Groupwork project	V. Strezov
7 November	Groupwork project	V. 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

- 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

- Water quality analysis report
- Impact 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

- Fieldtrip journal
- Water quality analysis report
- Air quality exercise
- Impact 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

- Fieldtrip journal
- Water quality analysis report
- Air quality exercise
- Impact 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

- Water quality analysis report
- Impact Assessment

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

- Fieldtrip journal
- Water quality analysis report
- Air quality exercise
- Impact 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
- Water quality analysis report
- Impact Assessment