GSE 805

Air and Water Quality

S2 Evening 2014

Dept of Environment & Geography

Contents

General Information

Unit convenor and teaching staff
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Credit points
4

Prerequisites
GSE803

Corequisites

Co-badged status

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 specific problems in the context of regional and national air and water quality issues.

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

Presenting with impact to both wide and specialised audience

Assessment Tasks

Name	Weighting	Due
Critical literature review	35%	Week 7
5 take home exercises	45%	Weekly
Presentation and participation	20%	Week 13

Critical literature review

Due: **Week 7**
Weighting: **35%**

An assignment of 3,500 words in the form of a critical review on one of a range of set subjects. Thorough search and assessment of relevant scientific and professional literature will be necessary. This is an exercise in assessing and evaluating scientific materials within an environmental management perspective. Assignment details and guidance to be provided in week 3.

On successful completion you will be able to:

- Understand the language and fundamental principles of air and water quality science.
- Appreciate the uncertainty of the air and water quality data and specialist outputs such as air and water quality models
- 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

5 take home exercises

Due: **Weekly**
Weighting: **45%**

Five (5) tutorial exercises will be distributed approximately fortnightly from the second week, based on the lectures. Participants must complete all 5. It is important that they be completed promptly following the lectures to reinforce the learning process.

Marks: 10 marks for exercise 1-4 and 5 marks for exercise 5; 35% of the total unit mark. Due: Weekly, ie. Exercise 1 (Week 3) due on Week 4. There will be some weeks with no exercises set.

Late exercises: Late penalties - 0.5 mark for each day of late submission. No exercise will be accepted two weeks after its due date.

On successful completion you will be able to:

- Interpret raw data in environmentally significant terms.
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- Define air and water quality management problems in scientific terms.
- Locate sources of air and water quality information.

Presentation and participation

Due: **Week 13**
Weighting: **20%**

Students will be assigned to groups with individual topics in week 6 to work on the issues of opportunities and challenges for air and water quality of geoengineering.

The mark will consist of 10% for groupwork and 10% for individual presentation and participation.

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 specific problems in the context of regional and national air and water quality issues.

- Presenting with impact to both wide and specialised audience

Delivery and Resources

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

A. Specialist texts (earlier editions are adequate for our purposes in GSE 805)

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.

Information on the hazards of particular chemicals may be found in: N. Sax, Handbook of Dangerous Industrial Materials.

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/ Australian State of the Environment Report 2011.

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.

P. Brimblecombe, Air Composition and Chemistry.

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

B.J. Finlayson-Pitts and J.N. Pitts, Atmospheric Chemistry: Fundamentals and Experimental Techniques.

Nicolas Moussiopoulos (ed.) Air Quality in Cities Roger Gorham Air pollution from ground transportation: an assessment of causes, strategies and tactics, and proposed actions for the international community.

Mark Z. Jacobson. Atmospheric pollution: history, science, and regulation.

D. Elsom Atmospheric Pollution: a global problem Peter Warneck Chemistry of the natural atmosphere R.P. Wayne 1991 Chemistry of Atmospheres 2nd Edition.

Rainer Friedrich, Stefan Reis (eds.) Emission of air pollutants: measurements, calculation and uncertainties.

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.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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/

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://informatics.mq.edu.au/help/.

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

Graduate Capabilities

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
- Locate sources of air and water quality information.

Assessment tasks

- Critical literature review
- 5 take home exercises
- Presentation and participation

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

- 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
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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 specific problems in the context of regional and national

air and water quality issues.
- Define air and water quality management problems in scientific terms.
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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

- Understand the language and fundamental principles of air and water quality science.
- Interpret raw data in environmentally significant terms.
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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

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

- Presenting with impact to both wide and specialised audience

Assessment tasks

- Critical literature review
- Presentation and participation

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

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