



# GEOS375

## Environmental Geology

S2 External 2014

*Earth and Planetary Sciences*

### Contents

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<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>	7
<u>Policies and Procedures</u>	7
<u>Graduate Capabilities</u>	8
<u>Changes since First Published</u>	14

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## General Information

### Unit convenor and teaching staff

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Credit points

3

Prerequisites

39cp including (ENVE266 or GEOS206)

Corequisites

GEOS207

Co-badged status

### Unit description

This unit deals with the interaction of people and the geological environment, including issues arising from people's occupation and exploitation of the Earth. The unit covers both urban and resource geology, and geologic hazards. Students work on three projects based on realistic workplace scenarios including preparing tenders, data analysis and report writing using industry standard styles. One project involves the collection of data at a field site. The lecture program includes invited speakers from industry.

## 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:

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Assessment Tasks

Name	Weighting	Due
<a href="#">Project 1: Group Tender (P/F)</a>	0%	22/08/2014
<a href="#">Project 1: Individual Report</a>	30%	05/09/2014
<a href="#">Project 2: Group Discussion</a>	5%	3/10/2014
<a href="#">Project 2: Individual Report</a>	15%	17/10/2014
<a href="#">Project 3: Individual Report</a>	20%	14/11/2014
<a href="#">Exam</a>	30%	Exam period

## Project 1: Group Tender (P/F)

Due: **22/08/2014**

Weighting: **0%**

Company group tender for Project 1 (pass/ fail)

On successful completion you will be able to:

- Understanding of the tools and methods that are used in environmental geology;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Project 1: Individual Report

Due: **05/09/2014**

Weighting: **30%**

Individual Preliminary Investigation Report. Analysis of an old industrial and contaminated site - the Pasmenco smelter site and surrounds, Lake Macquarie, NSW

On successful completion you will be able to:

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Project 2: Group Discussion

Due: **3/10/2014**

Weighting: **5%**

Online CSG group presentation and discussion forum. Presentation due on 18/9, forum discussion ends on the 3/10.

On successful completion you will be able to:

- Understanding of the tools and methods that are used in environmental geology;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Project 2: Individual Report

Due: **17/10/2014**

Weighting: **15%**

Resource Extraction Planning, Coal Seam Gas: Environmental Impact Statement (EIS) Report.

On successful completion you will be able to:

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Project 3: Individual Report

Due: **14/11/2014**

Weighting: **20%**

Hazard assessment report

On successful completion you will be able to:

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding scientific methodology;

- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Exam

Due: **Exam period**

Weighting: **30%**

Final examination

On successful completion you will be able to:

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Delivery and Resources

### Unit outline

This unit will be presented in 3 modules:

1. Contaminated land: Process, guidelines and legal framework for the investigation of contaminated sites. These procedures will be used for completion of project 1.
2. Environmental impacts: Resource geology and problems associated with mining and coal seam gas extraction. The third project will build on these principles.
3. Geological hazards: Quantitative analysis and visualisation of slope stability. These techniques will be applied to project 3.

### Classes

This course is being run externally only. Lectures and unit materials will be uploaded to iLearn weekly. It is important that you stay up to date with this material. This is particularly important for the projects, which combined make up the bulk of the assessment for this course.

## Hours

This is a 3 credit point unit. It is anticipated that you will spend >9 hours per week involved with the unit. It is particularly important that you spend plenty of time preparing the three major assignments.

## Reading

There is no prescribed text for this unit. If you are interested in buying a book, I suggest:

Bell, F.G. 1998. Environmental Geology: principles and practice. Blackwell Science, London.

Reference books: References held in the Library Reserve, are:

Bell, F.G. 1998. Environmental Geology: principles and practice. Blackwell Science, London.

Keller, E.A., 2000. Environmental Geology. Prentice Hall, 562 pp.

There are a large number of books in the library that deal with aspects of environmental geology. Some of the following areas will be of interest (given as library call number):

GB1005 - hydrogeology QE38 - environmental geology QE515 - geochemistry KUC155 - environmental law S593 - soil testing TA703 - geotechnical engineering TA705/6 - engineering geology TD153 - environmental modelling TD193 - environmental chemistry TD195 - environmental impact statements TD426/427 - contaminated groundwater TD878 - contaminated land guidelines

## Unit Schedule

GEOS375 unit schedule: See unit handout

## 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](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](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](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/](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](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://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

### Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:



## Learning outcomes

- Understanding of the tools and methods that are used in environmental geology;
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- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Application of knowledge to solving problems and evaluating ideas and information; and

## Assessment tasks

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and

## Assessment tasks

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- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the tools and methods that are used in environmental geology;
- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and

## Assessment tasks

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

### Learning outcomes

- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and

### Assessment tasks

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

### Learning outcomes

- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;

- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and

## **Assessment tasks**

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## **Creative and Innovative**

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

## **Learning outcomes**

- Competence in applying geoscientific principles to understanding the world around you;
- Capacity to employ appropriate geoscientific tools to solve environmental problems and to interpret the results;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and

## **Assessment tasks**

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

### Learning outcomes

- Competence in applying geoscientific principles to understanding the world around you;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Competence in accessing, using and synthesising appropriate information;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

### Assessment tasks

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

### Learning outcomes

- Understanding of the tools and methods that are used in environmental geology;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;

- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Assessment tasks

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

## Learning outcomes

- Understanding of the tools and methods that are used in environmental geology;
- Understanding of the legal framework and industry-standard guidelines used by environmental scientists;
- Understanding scientific methodology;
- Application of knowledge to solving problems and evaluating ideas and information; and
- Capacity to present ideas clearly with supporting evidence.

## Assessment tasks

- Project 1: Group Tender (P/F)
- Project 1: Individual Report
- Project 2: Group Discussion
- Project 2: Individual Report
- Project 3: Individual Report
- Exam

## Changes since First Published

Date	Description
28/07/2014	Fixed typo (changed project 2 to 3)

Date	Description
28/06/2014	Assignment 3 due date modified.

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