



GEOS251

Minerals, Energy and the Environment

S1 External 2017

Dept of Earth and Planetary Sciences

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Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff

Lecturer

Christopher Firth

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by arrangement

Jennifer Rowland

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Credit points

3

Prerequisites

12cp at 100 level or above

Corequisites

Co-badged status

Unit description

This is a general education unit that introduces students to the technical, social, economic and environmental aspects that lie behind the production and use of mineral and energy resources in Australia and the rest of the world. The end products of these resources are familiar to us as steel for cars, aluminium for pots and pans, crude oil for petrol and coal for electricity. Nowadays, we have to consider acid rain, the greenhouse effect, heavy metal pollution, radiation, land degradation and land rights. Scarcity and resource exhaustion are also concerns. We demand and accept the goods and services provided by the minerals industries, including the increased wealth resulting from mineral exports, yet increasingly oppose the development of the resources that produce these goods. This does not mean that opposition to development is necessarily bad, or that development is necessarily good. What it does mean is that it is important to look at the broad picture rather than emotions. Learn about questions like: What is the economic importance of Australian mining? What are the environmental problems associated with this mining? Where are Australia's fossil fuels? How long will they last? Debate topics like: Should Australia adopt nuclear power as a 'clean' energy source? Should Australia, like Norway, insist on mining companies contributing to long term community wealth?

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:

An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources

Appreciation for the role and necessity for government, community and industry in determining policy

An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries

Assess the validity of scientific information

Communicate the findings of individual and group driven research through scientific writing and discussions

Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

General Assessment Information

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Assignment 1</u>	10%	No	17/3/17
<u>Assignment 2a</u>	5%	No	31/3/2017
<u>Assignment 2b</u>	25%	No	26/5/17
<u>ReadinGame Quiz</u>	10%	No	Week 13
<u>Practicals</u>	10%	No	Throughout semester
<u>Final exam</u>	40%	No	TBA

Assignment 1

Due: **17/3/17**

Weighting: **10%**

Explain the significance of ONE of the following metals on a national and global scale.

- Fe;
- Cu;
- Pb;
- Ag;
- Zn;
- Rare Earth Elements (REE).

Include what the metal is used for, its economic significance and any environmental or social consequences of its extraction and use.

On successful completion you will be able to:

- An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources
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- Assess the validity of scientific information
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- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

Assignment 2a

Due: **31/3/2017**

Weighting: **5%**

The extraction and use of minerals and energy resources is commonly a controversial topic that garners much attention in the news media. Examples include CSG exploration in northern NSW, development of a nuclear waste repository in SA, growth of the renewable energy industry in Australia, potential impacts of the Carmichael coal mine on the Great Barrier Reef.

Choose a minerals and energy resource issue that interests you and evaluate it, considering benefits and issues for all stakeholders.

A 250 word proposal explaining what you want to research and why it is relevant is due by the 31st March.

On successful completion you will be able to:

- An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources
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- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
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Assignment 2b

Due: **26/5/17**

Weighting: **25%**

The extraction and use of minerals and energy resources is commonly a controversial topic that garners much attention in the news media. Examples include CSG exploration in northern NSW, development of a nuclear waste repository in SA, growth of the renewable energy industry in Australia, potential impacts of the Carmichael coal mine on the Great Barrier Reef.

Choose a minerals and energy resource issue that interests you and evaluate it, considering benefits and issues for all stakeholders.

Once your proposal has been approved by the unit convenor you may proceed with the full 2500 word assignment, which is due by the 26th May.

On successful completion you will be able to:

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- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
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writing and discussions

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ReadinGame Quiz

Due: **Week 13**

Weighting: **10%**

We will be using a custom designed and built, online learning tool; “The ReadinGAME”. This game is designed to operate on a calendar week cycle (from Sunday to Sunday), and involves you being able to ask a question related on the weeks material from the readings and lectures. You will then be able to answer questions posed by other students, and most importantly, you will not only be able to score points for correctly answering the questions, but you will also be able to comment and discuss the questions, and rate whether they are good/not so good questions etc.

Importantly, in the process you will be learning and reinforcing the weeks material as well as having a lot of fun- it can be quite addictive.

To play, follow the link in iLearn, and simply ask a question relevant to the weeks material. You will then be able to play, by answering other questions and watching how your score accumulates. You will also be able to give feedback on other peoples questions and monitor your performance. There are multiple scoring paths, and different types of scores to achieve, depending on you interests.

At the end of the semester there will be a quiz worth 10% of question derived from the ReadinGAME.

On successful completion you will be able to:

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- Assess the validity of scientific information

Practicals

Due: **Throughout semester**

Weighting: **10%**

Two practicals will be chosen at random for marking - 5% each

On successful completion you will be able to:

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- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
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Final exam

Due: **TBA**

Weighting: **40%**

Final exam on material from lectures, assignments and pracs.

On successful completion you will be able to:

- An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources
- Appreciation for the role and necessity for government, community and industry in determining policy
- Assess the validity of scientific information

Delivery and Resources

Delivery is via lectures, which are recorded. Quizzes and assignments can be done online through iLearn, and all assignments may be submitted through iLearn or emailed directly to the lecturer. Attendance at tutorials/practicals is compulsory for internal students.

Unit Schedule

Week	Lecture A	Lecture B	Tutorial session
Week 1	2/3: Lecture 1 - Introduction (CF)	3/3: Lecture 2 - Global Mining Industry I (CF)	<u>No Tutorial</u>

Unit guide GEOS251 Minerals, Energy and the Environment

Week 2	9/3: Lecture 3 - Global Mining Industry II (CF)	10/3: Lecture 4 - The Exploration Process (CF)	Mineral exploration: Identifying a target (or, where is it?)
Week 3	16/3: Lecture 5 - Mining and Processing technology (CF)	17/3: Lecture 6 - Metals and industrial minerals (CF)	Mineral exploration: Evaluating a resource (or, how much is it worth!)
Assignment 1 Due Fri 17/3			
Week 4	23/3: Lecture 7 - Supply and demand in the minerals industry (CF)	24/3: Lecture 8 - Financing the Minerals Industry (CF)	Mining Boom?
Week 5	30/3: Lecture 9 - Strategic commodities: (CF)	31/3: Lecture 10 - Mining and Environment (CF)	Environmental Impacts - Queenstown
Assignment 2a Due Fri 31/3			
Week 6	6/4: Lecture 11 - Mining and Society (CF)	7/4: Lecture 12 - Land Use, Native Title (CF)	Strategic Commodities: REE
Week 7	13/4: Lecture 13 - Diamonds (CF)	14/4: <u>No Lecture</u> - Easter	<u>No Tutorial</u>
Mid-semester Break (14/4-30/4 2017)			
Week 8	4/5: Lecture 14 - Oil and Gas (SG)	5/5: Lecture 15 - Coal (SG)	Future Gas Sources in Australia
Week 9	11/5: Lecture 16 - Supply, Demand, Energy (CF)	12/5: Lecture 17 - Uranium (CF)	Uranium waste
Week 10	18/5: Lecture 18 - Alternative Energy I (CF)	19/5: Lecture 19 – Alternative Energy II (CF)	Geothermal exploration <u>or</u> Carbon sequestration
Week 11	25/5: Lecture 20 - Air Pollution (CF)	26/5: Lecture 21 - Climate (CF)	Human Induced Climate Change and mass extinctions: fact or fiction?
Assignment 2b Due Fri 26/5			

Week 12	1/6: Lecture 22 - Sustainable Development I (CF)	2/6: Lecture 23 - Sustainable Development II (CF)	Revision Q&A
Week 13	8/6: Lecture 24 – Competing Resources (CF)	9/6: Lecture 25 - Revision (CF)	<u>No Tutorial</u>

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

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

- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Communicate the findings of individual and group driven research through scientific writing and discussions
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

Assessment tasks

- Assignment 1

- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals

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

- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Assess the validity of scientific information
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Assessment tasks

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- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final 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

- Appreciation for the role and necessity for government, community and industry in determining policy
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Assess the validity of scientific information
- Communicate the findings of individual and group driven research through scientific writing and discussions
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Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final 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

- An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources
- Appreciation for the role and necessity for government, community and industry in determining policy
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Assess the validity of scientific information

- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final 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

- An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources
- Appreciation for the role and necessity for government, community and industry in determining policy
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Assess the validity of scientific information
- Communicate the findings of individual and group driven research through scientific writing and discussions
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Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals

- Final 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

- Appreciation for the role and necessity for government, community and industry in determining policy
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Assess the validity of scientific information
- Communicate the findings of individual and group driven research through scientific writing and discussions
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Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals

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

- Assess the validity of scientific information
- Communicate the findings of individual and group driven research through scientific

writing and discussions

- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b
- ReadinGame Quiz
- Practicals
- Final 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

- Appreciation for the role and necessity for government, community and industry in determining policy
- Assess the validity of scientific information
- Communicate the findings of individual and group driven research through scientific writing and discussions
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b

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

- An understanding of which are the major resources necessary for our modern society to function and insights into the economic drivers for the optimization of these resources
- Appreciation for the role and necessity for government, community and industry in determining policy
- An ability to research and evaluate evidence regarding issues in the minerals, energy and environmental industries
- Communicate the findings of individual and group driven research through scientific writing and discussions
- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

Assessment tasks

- Assignment 1
- Assignment 2a
- Assignment 2b

Changes since First Published

Date	Description
27/02/2017	Unit schedule/dates updated