GEOS251

Minerals, Energy and the Environment

S1 External 2018

Dept of Earth and Planetary Sciences

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General Information

Unit convenor and teaching staff
Lecturer
Christopher Firth
christopher.firth@mq.edu.au
Contact via christopher.firth@mq.edu.au
12WW.240
by arrangement

Lectu
Simon George
simon.george@mq.edu.au

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 the links between fossil fuels, agriculture, population growth and climate

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 information from a range of sources, including scientific communication and popular media

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 receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in iLearn (bit.ly/FSESupp) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	10%	No	29/3/18
Assignment 2a	5%	No	6/4/2018
Assignment 2b	25%	No	25/5/18

Name	Weighting	Hurdle	Due
ReadinGame Quiz	10%	No	Week 13
Practicals	10%	No	Throughout semester
Final exam	40%	No	TBA

Assignment 1

Due: **29/3/18**
Weighting: **10%**

Explain what unconventional hydrocarbons are AND how they have changed the fossil fuel market over the last decade.

On successful completion you will be able to:

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Assignment 2a

Due: **6/4/2018**
Weighting: **5%**

The extraction and use of energy resources and anthropogenic impacts on climate are controversial topics that garner much attention in the news media. Chose an energy resource or climate debate 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 6th of April.

On successful completion you will be able to:

- An understanding of the links between fossil fuels, agriculture, population growth and climate
- 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 information from a range of sources, including scientific communication and popular media
- Communicate the findings of individual and group driven research through scientific writing and discussions
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Assignment 2b

Due: **25/5/18**
Weighting: **25%**

The extraction and use of energy resources and anthropogenic impacts on climate are controversial topics that garner much attention in the news media. Chose an energy resource or climate debate 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 25th May.

On successful completion you will be able to:

- An understanding of the links between fossil fuels, agriculture, population growth and climate
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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 calender 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.

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- Assess the validity of information from a range of sources, including scientific communication and popular media

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
- Assess the validity of information from a range of sources, including scientific communication and popular media
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- Develop informed opinions regarding societal issues, and understand what influences your personal decision making process

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 the links between fossil fuels, agriculture, population growth and climate
- Appreciation for the role and necessity for government, community and industry in determining policy
- Assess the validity of information from a range of sources, including scientific communication and popular media

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

Module	Week	Lecture 1 Thurs 10-11 am 10 Hadenfield Av. 212	Lecture 2 Fri 8-9 am 9 WW.133	Tutorial Wed 11-12 am Wed 2-3 pm
Introduction	1	1/3/18 Introduction (CF)	2/3/18 Historical perspectives on climate and energy (CF)	**No Tutes**
The Fossil Fuel Industry	2	8/3/18 Oil & Gas (SG)	9/3/18 Coal (SG)	Population growth
	3	15/3/18 Unconventional Hydrocarbons: CBM, shale gas (SG)	16/3/18 Tar sands and oil shales (SG)	Oil use in society
	4	22/3/18 CO_2 Geosequestration (SG)	23/3/18 Supply and Demand/Energy Security/ Peak Oil (SG)	Future Gas sources in Australia
	5	29/3/18 Conflicts over energy resources (CF)	30/3/18 **Easter – No Lecture**	Peak Oil discussion forum
	6	5/4/18 Environmental/social/ cultural impacts of fossil fuels (CF)	6/4/18 Air Pollution (CF)	Deepwater Oil drilling
Changing Climate	7	12/4/18 Climate Change – Geological Record (CF)	13/4/18 Anthropogenic climate change (CF)	Air pollution
	Mid-semester break (16/4/18-30/4/18)			
	8	3/5/18 Climate change impacts (CF)	4/5/18 Social consequences of climate change (CF)	Records of climate change
	9	10/5/18 Economic costs of climate change (CF)	11/5/18 Climate change adaptation	Melting ice sheets
Solutions	10	17/5/18 Alternative Energy I (CF)	18/5/18 Alternative Energy II (CF)	The cost of rising sea levels

	11	24/5/18 Nuclear Energy (CF)	25/5/18 Strategic commodities (CF)	Fukushima
	12	31/5/18 Climate Policies/Sustainable Development (CF)	1/6/18 Climate Policies/Sustainable Development II (CF)	REE
	13	7/6/18 The Future (CF)	8/6/18 Revision (CF)	TBC

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). 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). 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).

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 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 information from a range of sources, including scientific communication and popular media
- Communicate the findings of individual and group driven research through scientific writing and discussions
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Assessment tasks

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- 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 information from a range of sources, including scientific communication and popular media
- 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 the links between fossil fuels, agriculture, population growth and climate
- 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 information from a range of sources, including scientific communication and popular media
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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 the links between fossil fuels, agriculture, population growth and climate
- 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 information from a range of sources, including scientific communication and popular media
- 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 information from a range of sources, including scientific communication and popular media
- 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 information from a range of sources, including scientific communication and popular media
- 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 information from a range of sources, including scientific communication and popular media
- 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 the links between fossil fuels, agriculture, population growth and climate
- 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
26/02/2018	Changes to Assessment notes