



ENVS214

Climate Change

S2 External 2017

Dept of Environmental Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	4
<u>General Assessment Information</u>	5
<u>Assessment Tasks</u>	5
<u>Delivery and Resources</u>	7
<u>Unit Schedule</u>	8
<u>Policies and Procedures</u>	9
<u>Graduate Capabilities</u>	10

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General Information

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Credit points 3
Prerequisites 18cp at 100 level or above
Corequisites
Co-badged status
Unit description Global climate change is one of the most important issues that humanity will have to grapple with in the twenty-first century. This unit investigates our climate system's complex processes, together with the impacts that climate change will have, and what we must do to adapt to and mitigate those impacts. Natural climate variability, abrupt climate change and anthropogenic climate change are key areas of study, together with their impacts on past and modern civilization. The unit is structured around three themes: - detection and attribution of climate change; - biophysical and socio-economic impacts of climate change; - adaptation, mitigation and decision making. This unit is pitched to a diverse audience; social, economic, engineering and political perspectives are all presented by a panel of internationally renowned experts drawn from the University's Concentration of Research Excellence (CORE) in Climate Futures. There are no presumed skills for enrolment in this multidisciplinary unit.

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:

- Develop an informed holistic world view of the climate change issue
- Develop and understating and appreciation of the scientific method
- Understand the way science is communicated through peer review science journal articles and their interpretation through popular media
- Understand fundamental physical mechanisms driving climate variability and change
- Differentiate natural climate variability from global warming
- Familiarity with the basic data and statistical methods used to study climate change
- Explore global impacts of climate change on Earths physical and biological systems
- Examine the socioeconomic and ecological impacts of current and projected climate change
- Explore options for mitigating and adapting to projected climate change

General Assessment Information

SUBMISSION REQUIREMENTS

All assignments are to be submitted via Turnitin, the university online submission and marking system - found as a link in iLearn. Turnitin includes Grademark, a paperless grading system where your assignments are marked by staff online. Submissions are also checked for plagiarism by Turnitin. Turnitin automatically compares your work to the work of your classmates, previous students and material available on the internet. Hard copys of assignments are no longer accepted and will not be marked.

For more information on Turnitin and Grademark:

http://mq.edu.au/iLearn/student_info/assignments.htm

DEADLINES, EXTENSIONS AND PENALTIES

Deadlines set for assignment submissions will not be altered except in exceptional circumstances. In all cases, extensions must be applied for before the due date and must be supported with appropriate documentation (medical certificate, counsellor's certificate, statutory declaration). Where an unavoidable disruption warrants an extension, you may also wish to consider applying for Disruption to Studies. Requests for disruption to studies are submitted via ask.mq.edu.au. Instructions on how to submit your disruption to studies request can be found here: <http://ask.mq.edu.au/kb.php?record=ce7c4e38-4f82-c4d7-95b1-4e2ee8fd075f>

Extensions will not be granted in cases of poor time management. Only the Unit Convenor can authorise extensions. Late submissions will not be accepted once marked assignments have been returned unless otherwise approved by the Unit Convenor.

Late assignments will incur a late penalty of 10% of the total mark per day. Weekends will be counted as 2 days. Penalties will also be incurred for plagiarism, that is, the use of another persons' work and presentation as your own (see University Policies and http://www.mq.edu.au/policy/docs/academic_honesty/policy.html).

GRADING

Each assignment will be marked, commented upon and returned to you via Turnitin and Grademark. Grading is conducted in line with the universities grading policy (<http://www.mq.edu.au/policy/docs/grading/policy.html>)

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Practical Reports x 3</u>	30%	No	1 week after practical class
<u>Research report</u>	20%	No	20th October Week 10
<u>Final exam</u>	50%	No	November 2017

Practical Reports x 3

Due: **1 week after practical class**

Weighting: **30%**

Reading and review exercises assigned in practical class. Each practical report will be with 10% of your final grade. Reports must be submitted via Turnitin within 1 week of the practical class in which it was assigned. More details will be provided during practical classes.

On successful completion you will be able to:

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- Explore global impacts of climate change on Earths physical and biological systems

Research report

Due: **20th October Week 10**

Weighting: **20%**

Students will write a 1200 word research report exploring the scientific justification and feasibility of efforts to limit global mean temperature increase to less than 1.5°C. More details on this assignment will be provided in week 7.

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- Examine the socioeconomic and ecological impacts of current and projected climate change
- Explore options for mitigating and adapting to projected climate change

Final exam

Due: **November 2017**

Weighting: **50%**

2 hour long final examination during the Semester 2 examination period. Material drawn from all lectures, practicals and assignments. Details of the exam conditions will be discussed during the last lecture.

On successful completion you will be able to:

- Understand fundamental physical mechanisms driving climate variability and change
- Differentiate natural climate variability from global warming
- Familiarity with the basic data and statistical methods used to study climate change
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Delivery and Resources

Delivery

There are two lectures each week, and you also need to enrol in a specific practical class.

Timetable information can be found at: <https://timetables.mq.edu.au>

Lectures

There are 2 x 1 hour lectures each week:

Wednesday, 4:00 - 5:00, W5A T2

Friday, 3:00 - 4:00, E7B T5

Practicals

There is 1 x 1 hour practical each week. The options are:

Wednesday, 9:00 - 10:00, E5A270

Wednesday 12:00 - 1:00, E5A260

Wednesday 1:00 - 2:00, E5A270

Wednesday 5:00 - 6:00, E5A260

Friday 11:00 - 12:00, E5A260

Friday 12:00 - 1:00, E5A270

Friday 1:00 - 2:00, E5A260

Resources

The primary resources for this unit will be the Intergovernmental Panel on Climate change (IPCC) Fifth Assessment Report (AR5) (available from <https://www.ipcc.ch/index.htm>) and published research papers relevant to each lecture topic. The following textbooks (available from Macquarie University Library) also provide a good overview of the climate change problem:

1. Bloom, A.J. 2010. Global Climate Change. Convergence of Disciplines. Sinauer Associates, Sunderland, MA, USA.
2. Houghton, J. 2010. Global Warming: The Complete Briefing. Fourth Edition. Cambridge University Press, Cambridge , U.K., 438 pages.
3. Hannah, L. 2010. Climate Change Biology. Academic Press. 416 pages.

Unit Schedule

Week	Date	Lecture title	Practical
1	2-Aug	L1 Climate Change: what's the big deal and why should we care? (LH)	No Practical
	4-Aug	L2 The historical context: what can we learn? (LH)	
2	9-Aug	L3 Introduction to the climate system and variability (SB)	Human perception and change denial (SB) (Practical report 1 set)
	11-Aug	L4 Introduction to the drivers of climate change (SB)	
3	16-Aug	L5 Climate change projections (KM)	How to lie with statistics (KM) (Practical report 1 due)
	18-Aug	L6 Using science to clarify climate misconceptions (KM)	
4	23-Aug	L7 Oceans and coastal environments (NS)	Abrupt change (NS) (Practical report 2 set)
	25-Aug	L8 Cryosphere and alpine environments (IG)	
5	30-Aug	L9 Natural ecosystems 1: terrestrial and freshwater systems (LH)	Ecosystem change practical (NS) (Practical report 2 due)
	1-Sep	L10 Natural ecosystems 2: marine systems (LH)	
6	6-Sep	L11 Climate change and human civilisations (SB)	Climate change historical context (KM) (Practical report 3 set)
	8-Sep	L12 Is climate change fair?: the question of social justice (LH)	
7	13-Sep	L13 Impacts, adaptation and vulnerability	West Australia municipal water, value of water, drought resilience (RR) (Practical report 3 due, research report set)
	15-Sep	L14 Water security (RR)	
8	4-Oct	L15 Climate change is the biggest global health threat of the 21st century (PB)	Pollen and people (PB)

	6-Oct	L16 Tackling climate change could be the greatest global health opportunity of the 21st century (PB)	
9	11-Oct	L17 Food security (SB)	Great Barrier Reef: Marine heat waves (SB)
	13-Oct	L18 Tourism and heritage (SB)	
10	18-Oct	L19 Indigenous issues, sovereignty and conflict (SB)	Geoengineering practical (SB) (Research report due)
	20-Oct	L20 Extreme solutions: geoengineering (IG)	
11	25-Oct	L21 The international context: implications for Australia (LH)	Australia's history on climate policy
	27-Oct	L22 Preventing vs coping with climate change: mitigation and adaptation synergies and tradeoffs (LH)	
12	1-Nov	L23 Economics of Mitigation and Adaptation (RR)	Analyzing Carbon Tax Impacts through graphs / Energy Efficiency policies and Rebound Effect
	3-Nov	L24 Economics of Mitigation and Adaptation (RR)	
13	8-Nov	L25 Plausible Solutions (NS)	No practical
	10-Nov	L26 Unit summary (SB)	

PB – A/Prof. Paul Beggs; SB – Dr. Stuart Browning; KM-Katrina MacSween; IG – A/Prof. Ian Goodwin; LH – Prof. Lesley Hughes; RR – Dr. Ram Ranjan; NS – Prof. Neil Saintilan.

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

- Explore global impacts of climate change on Earth's physical and biological systems
- Examine the socioeconomic and ecological impacts of current and projected climate change
- Explore options for mitigating and adapting to projected climate change

Assessment task

- Final exam

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

- Differentiate natural climate variability from global warming
- Explore global impacts of climate change on Earth's physical and biological systems
- Examine the socioeconomic and ecological impacts of current and projected climate change

Assessment tasks

- Research report
- 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

- Develop an informed holistic world view of the climate change issue
- Develop and understanding and appreciation of the scientific method

- Understand the way science is communicated through peer review science journal articles and their interpretation through popular media
- Understand fundamental physical mechanisms driving climate variability and change
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- Explore options for mitigating and adapting to projected climate change

Assessment tasks

- Practical Reports x 3
- Research report
- 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

- Develop and understanding and appreciation of the scientific method
- Understand the way science is communicated through peer review science journal articles and their interpretation through popular media
- Understand fundamental physical mechanisms driving climate variability and change
- Differentiate natural climate variability from global warming
- Familiarity with the basic data and statistical methods used to study climate change

Assessment tasks

- Practical Reports x 3
- 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

- Develop an informed holistic world view of the climate change issue
- Develop and understanding and appreciation of the scientific method
- Understand the way science is communicated through peer review science journal articles and their interpretation through popular media
- Understand fundamental physical mechanisms driving climate variability and change
- Differentiate natural climate variability from global warming
- Familiarity with the basic data and statistical methods used to study climate change
- Examine the socioeconomic and ecological impacts of current and projected climate change
- Explore options for mitigating and adapting to projected climate change

Assessment tasks

- Practical Reports x 3
- Research report
- 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

- Develop an informed holistic world view of the climate change issue
- Develop and understanding and appreciation of the scientific method
- Understand fundamental physical mechanisms driving climate variability and change
- Differentiate natural climate variability from global warming
- Familiarity with the basic data and statistical methods used to study climate change
- Explore options for mitigating and adapting to projected climate change

Assessment tasks

- Practical Reports x 3
- Research report
- Final 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 outcome

- Understand the way science is communicated through peer review science journal articles and their interpretation through popular media

Assessment tasks

- Practical Reports x 3
- Research report
- 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

- Develop an informed holistic world view of the climate change issue
- Explore global impacts of climate change on Earth's physical and biological systems
- Examine the socioeconomic and ecological impacts of current and projected climate change
- Explore options for mitigating and adapting to projected climate change

Assessment task

- Final 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

- Develop an informed holistic world view of the climate change issue
- Differentiate natural climate variability from global warming
- Explore global impacts of climate change on Earth's physical and biological systems
- Examine the socioeconomic and ecological impacts of current and projected climate change
- Explore options for mitigating and adapting to projected climate change

Assessment tasks

- Practical Reports x 3
- Research report
- Final exam