



CLIM804

Climate Change and The Climate System

S1 External 2014

Dept of Biological Sciences

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General Information

Unit convenor and teaching staff

Stuart Browning

stuart.browning@mq.edu.au

Contact via stuart.browning@mq.edu.au

E7A 604

Anytime (email for appointment))

Kevin Cheung

kevin.cheung@mq.edu.au

Contact via kevin.cheung@mq.edu.au

E7A 601

Unit Convenor

Sandy Harrison

sandy.harrison@mq.edu.au

Contact via sandy.harrison@mq.edu.au

Other Staff

Katherine McClellan

katherine.mcclellan@mq.edu.au

Contact via katherine.mcclellan@mq.edu.au

Credit points

4

Prerequisites

Admission to MClmCh or MEnv or PGDipEnv or PGCertEnv or MWldMgt or PGDipWldMgt or PGCertWldMgt or MSc in Biodiversity Conservation or PGDipSc in Biodiversity Conservation or PGCert in Biodiversity Conservation

Corequisites

Co-badged status

Not co-badged / taught with any unit

Unit description

Global climate change is one of the important issues facing humanity in the 21st century; the ability to mitigate or adapt to projected climate changes depends on developing an integrated perspective on the physical, biological, biogeochemical, socio-economic and cultural factors that influence the climate system. This unit focuses on the scientific framework for understanding the mechanisms of climate change, and covers (a) the physics of the climate system, (b) the multiple drivers of climate change, (c) the role of physical and biogeochemical feedbacks in the climate system, (d) climate change projections and (e) how socio-economic, biophysical and biogeochemical feedbacks could modulate future changes. It will provide students with the background to critically evaluate current understanding of the complex interactions that determine climate trajectories and the reliability of the tools used to make climate-change and climate-impact projections. The course is taught by a team of internationally renowned experts drawn from the University's Concentration of Research Excellence (CORE) in Climate Futures.

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:

Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.

Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.

Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.

Able to apply climate change theory to novel situations in order to diagnose and solve problems.

Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Assessment Tasks

Name	Weighting	Due
On-line test	10%	21/3/2014
Research report	40%	30/5/2014

Name	Weighting	Due
<u>Final examination</u>	50%	TBA

On-line test

Due: **21/3/2014**

Weighting: **10%**

The test will require you to interpret data in the light on information covered in the first 3 weeks of lectures and reading

On successful completion you will be able to:

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.

Research report

Due: **30/5/2014**

Weighting: **40%**

You will prepare a report on an agreed topic, based on existing literature and reports. This will demonstrate your capability to synthesise scientific material and draw independent conclusions.

On successful completion you will be able to:

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.
- Able to apply climate change theory to novel situations in order to diagnose and solve problems.
- Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Final examination

Due: **TBA**

Weighting: **50%**

The examination will consist of multiple choice, short answers and a choice of essay questions which we test your ability to use terminology and concepts learnt in lecture and practical components of the course to answer a variety of questions and problems

On successful completion you will be able to:

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.
- Able to apply climate change theory to novel situations in order to diagnose and solve problems.
- Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Delivery and Resources

Resources:

The basic resource for this unit is the Working Group 1 contribution to the Fifth Assessment Report (AR5) for the Intergovernmental Panel on Climate Change (IPCC), particularly the Technical Summary and the Summary for Policy Makers. For more detail, read the individual chapters from the WG1 report. These documents can be downloaded from the IPCC webpage: <https://www.ipcc.ch/report/ar5/wg1/>

Delivery:

Lectures, readings and other supporting material will be available on iLearn. iLearn is a web-based computer mediated communication package and can be accessed by most web browsers from inside or outside the University. iLearn and email will be the principle method of communication in this subject.

We expect you to use iLearn to:

- Regularly check subject announcements
- Download lecture materials
- Download laboratory materials
- Download reference materials
- Check your grades

How do you log in? The URL for the iLearn log in page is: <http://ilearn.mq.edu.au/>. You will need to log in to iLearn each time you use it. Your user name is your student number. If you are having trouble accessing your online unit due to a disability or health condition, please go to the Student Services Website at <http://sss.mq.edu.au/equity/about> for information on how to get assistance. If you cannot log in after ensuring you have entered your username and password correctly, you should contact Student IT Help, Phone: (02) 9850 4357 (in Sydney) or 1 800 063 191 (outside Sydney).

Assessment tasks:

No extensions will be granted on assessment tasks. Students who have not submitted the assessment task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Unit Schedule

Week 1: Atmospheric composition and climate (Stuart Browning)

Week 2: Timescales and patterns of climate variability (Sandy Harrison)

Week 3: The climate system: atmospheric circulations (Kevin Cheung)

**** Assessment:** Online test due this week **

Week 4: The climate system: oceanic circulation (Kevin Cheung)

Week 5: Modelling climate and climate change (Kevin Cheung)

Week 6: Evaluation of model uncertainty (Sandy Harrison)

Week 7: Future climate change forcings: projections and uncertainties (Sandy Harrison)

Week 8: Projections of climate changes in the 21st century (Sandy Harrison)

Week 9: Projections of changes in water balance and hydrology (Stuart Browning)

Week 11: Projections of extremes: catastrophic events, tipping points and climate surprises (Stuart Browning)

**** Assessment:** Research Report due this week **

Week 12: Feedbacks in the climate system and climate change (Sandy Harrison)

Week 13: Summary, revisions sessions

**** Final assessment:** EXAM **

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

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.
- Able to apply climate change theory to novel situations in order to diagnose and solve problems.
- Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Assessment tasks

- On-line test
- Research report
- Final examination

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

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.
- Able to apply climate change theory to novel situations in order to diagnose and solve problems.

Assessment tasks

- On-line test
- Research report
- Final examination

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

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.
- Able to apply climate change theory to novel situations in order to diagnose and solve problems.

Assessment tasks

- On-line test
- Research report

- Final examination

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 outcome

- Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Assessment task

- Research report

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

- Able to apply climate change theory to novel situations in order to diagnose and solve problems.
- Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Assessment tasks

- On-line test
- Research report
- Final examination

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

- Capable of analysing, questioning, and synthesising knowledge about the causes of climate change causes from a range of sources.
- Capable of researching, interpreting, and assessing data on climate change and drawing connections across fields of knowledge.
- Able to handle scientific uncertainty and complexity with respect to current climate change and its impacts on the Earth System.
- Able to apply climate change theory to novel situations in order to diagnose and solve problems.
- Confidently communicate and convey opinions on climate change science in forms appropriate to different audiences.

Assessment tasks

- Research report
- Final examination