ENVS8104

Climate Change and Adaptation

Session 1, In person-scheduled-weekday, North Ryde 2024

School of Natural Sciences

Contents

General Information

Unit convenor and teaching staff
Professor
Neil Saintilan
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Room 125, 12 Wallys Walk
By appointment

Credit points
10

Prerequisites
Admission to MEnv or MSc or GradDipEnv or GradCertEnv or MWldMgt or MConsBiol or GradDipConsBiol or MMarScMgt or MSusDev or GradDipSusDev or GradCertSusDev or MPlan or MEngEnvSafetyEng or MScInnovationEnvSc

Corequisites

Co-badged status

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 climate change, and covers (a) the multiple drivers of climate change, (b) the role of physical and biogeochemical feedbacks in the climate system, (c) climate change projections, (d) impacts from anthropogenic climate change including those from extreme events and (e) the principles of mitigation and adaptation of climate change and how they are performed under national and international context. It will provide students with the background to critically evaluate current understanding of the complex interactions that determine climate trajectories, the reliability of the tools used to make climate-impact projections and the effectiveness of various mitigation and adaptation strategies.

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:

ULO1: analyse, question, and synthesise knowledge about climate change from a range of sources

ULO2: research, interpret, and assess data on climate change and draw connections across fields of knowledge

ULO3: Demonstrate an understanding of and effectively manage uncertainty in scientific data and complexity with respect to current climate change

ULO4: identify the impacts from climate change on the environment, energy, economy and health

ULO5: confidently communicate and convey opinions on climate change mitigation and adaptation strategies in forms appropriate to different audiences

General Assessment Information

Major Group Report: Due 24th May 2024

This is a group report. You will provide an integrated regional vulnerability assessment for your region (allocated for the Practical report), and specific, implementable adaptation options for local and state government. For the allocated region within New South Wales provide a precis of the potential impacts of climate change between now and 2070. In this section you may wish to reference the regional vulnerability assessments conducted by the NSW government (https://climatechange.environme nt.nsw.gov.au/Adapting-to-climate-change/Regional-vulnerability-and-assessment) Informed by current NSW government strategy, you will address vulnerability and provide adaptation options for the four themes below: • Infrastructure and Tourism • Agriculture and water resources • Human Health and emergency services • Natural ecosystems and cultural heritage. Provide immediate, short term (2-5 years) and long-term (5-10 year) strategies for implementation. Maximum 3000 words.

On-line Quiz.

Each on-line quiz will consist of 30 multiple choice questions, based solely on the lecture material. The quiz will be open in the afternoon and evening on the dates listed below. Students will have 1 hour to complete the quiz including reading time, and accessed through iLearn. Quiz 1 will cover material presented in lectures weeks 1-4 inclusive and will be held the Wednesday Week 5. Quiz 2 will cover material presented in lectures weeks 5-10 and will be held on the Wednesday Week 11

Public Communication

You will submit an article suitable for publication in "The Conversation" (https://theconversation.com/au), based on the information collected during your practical sessions in Weeks 1-5 inclusive.

On successful completion you will be able to:

• analyse, question, and synthesise knowledge about climate change from a range of sources

• research, interpret, and assess data on climate change and draw connections across fields of knowledge • Demonstrate an understanding of and effectively manage uncertainty in scientific data and complexity with respect to current climate change

* effectively communicate climate data to an educated non-specialist audience

Assessment Tasks

Name	Weighting	Hurdle	Due
Group Major Report on Climate Change Mitigation/Adaptation	50%	No	Week 12: 24th May 2024
Public Communication: "The Conversation"	30%	No	Week 7: 1st April 2024
Multiple quizzes	20%	No	Week 5, Week 11

Group Major Report on Climate Change Mitigation/Adaptation

Assessment Type [1]: Report
Indicative Time on Task [2]: 30 hours
Due: **Week 12: 24th May 2024**
Weighting: **50%**

Students will produce a report for a local government area providing short-term and medium-term adaptation strategies dealing with key climate change impacts across multiple sectors.

On successful completion you will be able to:

- research, interpret, and assess data on climate change and draw connections across fields of knowledge
- Demonstrate an understanding of and effectively manage uncertainty in scientific data and complexity with respect to current climate change
- identify the impacts from climate change on the environment, energy, economy and health
- confidently communicate and convey opinions on climate change mitigation and adaptation strategies in forms appropriate to different audiences

Public Communication: "The Conversation"

Assessment Type [1]: Report
Indicative Time on Task [2]: 20 hours
Due: **Week 7: 1st April 2024**
Weighting: **30%**

Short practical report combining and interpreting the results of several practical aspects of the unit.

Students will prepare an article for “The Conversation”, illustrations and hyperlinks, on climate change observations and impacts in a designated region (e.g. heat, wave, drought, storm, bushfire, flood).

On successful completion you will be able to:

- analyse, question, and synthesise knowledge about climate change from a range of sources
- research, interpret, and assess data on climate change and draw connections across fields of knowledge
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Multiple quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Week 5, Week 11**
Weighting: **20%**

We will administer two online quizzes at set points throughout the semester, which will assess understanding of the knowledge components of the unit. The quizzes will be weighted at 10 percent each for a total of 20 percent.

On successful completion you will be able to:

- research, interpret, and assess data on climate change and draw connections across fields of knowledge
- Demonstrate an understanding of and effectively manage uncertainty in scientific data

and complexity with respect to current climate change
- identify the impacts from climate change on the environment, energy, economy and health
- confidently communicate and convey opinions on climate change mitigation and adaptation strategies in forms appropriate to different audiences

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Lectures

The unit adopts a "flipped classroom" pedagogy, under which all lectures are presented in pre-recorded form available through iLearn, and the designed lecture time (Wednesday 10am) is an open discussion of key concepts presented in the lecture. You will get the most out of these sessions if you view the pre-recorded material prior to this time, and all content will be available by the Friday of the previous week. The live timeslot is an opportunity for you to ask questions, go over content you found difficult, or engage in discussion about the broader implications.

Workshops

Each week you are expected to attend the two-hour workshop in which we access a range of resources available for the analysis of climate change and associated impacts. These contribute to your Conversation article. Following this, the focus of the workshops switches to the major group report, where you will tackle climate change impacts and adaptation strategies for your allocated region.

Unit Schedule

	LECTURE: Online via Echo360, posted Friday the week prior. ***In person Q and A Wednesday 10am***	**TUTORIAL: Campus (11 WW 120 Tut room Wed 12-2pm) 11 WW130 tut room Wed 3-5pm)**
Week 1- (21 Feb)	**Atmospheric composition and climate** Earliest papers on global warming. The link between greenhouse gasses and temperature. Global Climate Models. Observation vs prediction	**Myth-busting 1**: The Climate Hiatus

Week 2- (28 Feb)	**Timescales of Climate Change and climate variability** The Tertiary and the Quaternary, Glacial and Interglacial periods, Trends through the Holocene	**Working with BOM climate data**
Week 3- (6 March)	**Projections of Climate Change in the 21st Century** Climate modelling for the IPCC. The projections of the 6th Assessment Report.	**The IPCC Interactive Atlas**
Week 4 (13 March)	**The Cryosphere, Ocean warming and Sea Level Rise impacts** Ice sheet collapse. Drivers of sea-level rise. Sea level rise observations and projections. Sea level rise impacts	**NARCLIM climate change projections**
Week 5 (20 March)	**Climate Change Vulnerability and Adaptation in Australia** Bushfires, including the 2020 season. Drought and agriculture. Extreme Heatwaves, snow season, coral bleaching, sea level rise vulnerability.	Online Quiz 1 **No Tutorial**
Week 6 (27 March)	**Coastal Adaptation case study**: Coastal management in Australia, including the NSW Coastal Reforms	**Myth Busting 2: Sea-level trends:** Online data and imaging tools; analysis of Port Kembla sea-level Data
Week 7 (3 April)	**Adaptation case study: Blue Carbon** Approaches to natural climate change mitigation and their limitations	**PRAC REPORT DUE APRIL 1** **Sea-level adaptation in Indonesia**
Week 8 (10 April)	**Adaptation case study: environmental water** The challenge of climate change adaptation in the Murray Darling Basin. The water market as an adaptation mechanism	**Guest seminar**: Snowy Hydro – climate change mitigation and adaptation
(17 April)	**Recess (UA Common Week)**	
(24 April)	**Recess**	
Week 9 (1 May)	**Climate Change winners and losers** Opportunities and vulnerabilities at the global scale. CO_2, warming and agriculture, fisheries, inter-generational equity, poverty and exposure.	**Adaptation planning in NSW-BlueCam** **+** introduction to the report

Week 10 (8 May)	**Mitigation: the IPCC Framework** Emissions and temperature outcomes. Contributions to global emissions. Trends in emissions by sector	Group report preparation, and **group/ theme consultations – by appointment**
Week 11 (15 May)	**Opportunities for mitigation in Australia** Market mechanisms, carbon pricing and emissions trading. History of Australian climate and energy policy. Opportunities for transition to low emissions technology. Natural carbon sequestration and storage	Online Quiz 2 **No tutorial: Group work on adaptation report**
Week 12 (22 May)	**Reasons for hope: opportunities for global mitigation**. Trends in emissions, current commitments (post-Glasgow), prospects and ongoing challenges	**Unpacking mitigation targets and trends (simulation game)** **MAJOR REPORT DUE**
Week 13 (29 May)	**Overview and Key Learnings**	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of

Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual

assault

- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.

Unit information based on version 2024.04 of the Handbook