



ENVS8104

Climate Change and Adaptation

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Natural Sciences

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Disclaimer

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General Information

Unit convenor and teaching staff

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Room 125, 12 Wallys Walk

By appointment

Tutor

Anjali Gopakumar

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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 or GradDipResFSE or GradCertResFSE

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.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Climate Action

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 26th May 2025 and Presentation of Findings (in Week 12 or 13)

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 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 relevant government agencies

Informed by current 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. Results will be presented to the class in Weeks 12 and 13 of semester.

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 Tuesday Week 5. Quiz 2 will cover material presented in lectures weeks 5-10 and will be held on the Tuesday 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

Unit Requirements

Requirement to pass the unit: To pass this unit you must achieve a total mark equal to or greater than 50%

We strongly encourage all students to actively participate in all learning activities. Regular engagement is crucial for your success in this unit, as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern. For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration.

Assessments where Late Submissions will be accepted:

Assessment 1 Quiz: NO, unless Special consideration is Granted

Assessment 2 Conversation article: YES, Standard Late Penalty Applies

Assessment 3 Group Assignment: YES, Standard Late Penalty Applies

Assessment 4 Presentation: NO, unless Special Consideration is Granted

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and

which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Multiple quizzes</u>	20%	No	26th March, 20th May
<u>Public Communication: "The Conversation"</u>	30%	No	05/04/2025
<u>Group Major Report on Climate Change Mitigation/Adaptation</u>	35%	No	26/05/2025
<u>Presentation</u>	15%	No	Weeks 12 and 13

Multiple quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **26th March, 20th May**

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

Public Communication: "The Conversation"

Assessment Type ¹: Report

Indicative Time on Task ²: 20 hours

Due: **05/04/2025**

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

Group Major Report on Climate Change Mitigation/Adaptation

Assessment Type ¹: Report

Indicative Time on Task ²: 25 hours

Due: **26/05/2025**

Weighting: **35%**

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

Presentation

Assessment Type ¹: Presentation

Indicative Time on Task ²: 5 hours

Due: **Weeks 12 and 13**

Weighting: **15%**

Presentations of the group's major report, including findings and recommendations.

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

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 prerecorded form available through iLearn, and key concepts are discussed by zoom in the lecture timeslot. 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. Within the Workshop you will have 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. We will also engage with key concepts introduced in the lectures. 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 focus region

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn

Unit Schedule

	LECTURE: Online via Echo360, posted Friday the week prior. Lecture discussion Monday 1pm by Zoom	TUTORIAL: Campus (14 SCO 264 Tut room Tues 1-3pm; Tues 4-6pm)
Week 1- (25 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- (5 March)	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- (12 March)	Projections of Climate Change in the 21st Century Climate modelling for the IPCC. The projections of the 6 th Assessment Report.	The IPCC Interactive Atlas Climate projections
Week 4 (19 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	Myth Busting 2: Sea-level trends: Analysis of local and global sea-level data
Week 5 (26 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.	Sea-level adaptation in Indonesia, USA and Australia Online data and imaging tools Online quiz 1

Week 6 (2 April)	Coastal Adaptation case study: Coastal management in Australia, including the NSW Coastal Reforms	PRAC REPORT (CONVERSATION PIECE) DUE APRIL 5 Adaptation planning in NSW-BlueCam
Week 7 (8 April)	Adaptation case study: Blue Carbon Approaches to natural climate change mitigation and their limitations	Introduction to the major report and formation of groups.
(15 April)	Recess (UA Common Week)	
(22 April)	Recess	
Week 8 (29 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: A Planning Ministers perspective: Prof Rob Stokes (1pm-3pm timeslot + online)
Week 9 (6 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.	Group report preparation, and group/theme consultations – by appointment
Week 10 (13 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 (20 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 Guest Seminar: Energy Transition in Australia (Associate Professor Madeline Taylor) (1pm-3pm timeslot+ online)
Week 12 (27 May)	Reasons for hope: opportunities for global mitigation. Trends in emissions, current commitments (post-Glasgow), prospects and ongoing challenges	Guest Seminar: Snowy Hydro on impact, adaptation and mitigation MAJOR REPORT DUE 26th May
Week 13 (29 May)	Overview and Key Learnings	Presentation of findings

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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 \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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 connect.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 the [Service Connect Portal](#), 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.

Changes from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page

Unit information based on version 2025.04 of the [Handbook](#)