COURSE OUTLINE

ENS204 Climate Change Mitigation and Adaptation

School: School of Science, Technology and Engineering

2026 | Trimester 2

UniSC Sunshine Coast
UniSC Moreton Bay

BLENDED LEARNING

Most of your course is on campus but you may be able to do some components of this course online.

Please go to unisc.edu.au for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

Two centuries of burning fossil fuels and clearing land have changed our climate and produced largely irreversible and almost exclusively negative impacts on the environment and our wellbeing. In this course you'll learn basic climate science and use software to model future temperature, precipitation and sea-level scenarios. You'll investigate impacts already occurring and the limits of people and ecosystems to adapt. Spoiler alert: major challenge. Don't despair,you'll then take over as global climate change negotiator and propose policies to transform the way we live to avert catastrophe.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Tutorial/Workshop 1 – Face-to-face workshop	1hr	Week 1	12 times
Laboratory 1 – Face-to-face computer lab	2hrs	Week 1	12 times
Learning materials – Instructional videos and curated learning resources for student review prior to class.	1hr	Week 1	12 times

1.3. Course Topics

Module 1: Science Fundamentals of climate change science including: greenhouse gases, radiative forcing potential, carbon dioxide equivalency, natural climate forcing factors, emissions sources and sinks, climate sensitivity and feedback loops, thermohaline and vertical diffusivity, emissions scenarios, general circulation models, downscaling, spatial and other representations, IPCC Working Group 1.

Module 2: Adaptation Direct and indirect climate change impacts on natural and human systems; perturbation, resiliency, coping and adaptation; principles of adaptation, principles of assessment and evaluation; multi-criterion analysis and decision making; writing key messages. IPCC Working Group 2.

Module 3: Mitigation Greenhouse gas sources by region and economic sector; mitigation strategies and technologies by sector; national and global climate change mitigation strategies and policies; United Nations Framework Convention on Climate Change purpose, signatories, history, agreements, barriers to progress. IPCC Working Group 3.

2. What level is this course?

200 Level (Developing)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...	GRADUATE QUALITIES MAPPING Completing these tasks successfully will contribute to you becoming...	PROFESSIONAL STANDARD MAPPING * Education for Sustainable Development Goals
1 Demonstrate developing-level knowledge of the science of climate change including the main carbon sources and sinks, the characteristics of different greenhouse gases and their influence on global average temperatures and ocean acidity, and their current and trending emissions profile and likely climatic changes that will result.	Knowledgeable	13.1.1, 13.1.2, 13.1.3
2 Demonstrate developing-level knowledge of the concept, principles, and limits of adaptation in relation to impacts from changes in temperature, precipitation, sea-level rise, storm intensity, and ocean acidification on human and natural systems and the be able to articulate factors that determine resilience and adaptive capacity.	Knowledgeable Creative and critical thinker Sustainability-focussed	13.1.4, 13.1.5, 13.2.1, 13.2.2
3 Demonstrate developing-level knowledge of the relationship between emissions and different sectors of economies and communities and be able to articulate policies and actions to reduce emissions, enhance sinks, and limit future change.	Knowledgeable Ethical Sustainability-focussed	13.1.5, 13.2.4, 13.2.5, 13.3.3, 13.3.4
4 Demonstrate developing-level knowledge of climate change policy frameworks and other initiatives at different scales and the ethical and practical issues associated with setting and meeting substantive emission reduction targets, adapting to changes, and securing sustainable development.	Ethical	13.1.3, 13.2.1, 13.2.4, 13.2.5, 13.3.3

* Competencies by Professional Body

CODE	COMPETENCY
EDUCATION FOR SUSTAINABLE DEVELOPMENT GOALS	
13.1.1	The learner understands the greenhouse effect as a natural phenomenon caused by an insulating layer of greenhouse gases.

CODE	COMPETENCY
13.1.2	The learner understands the current climate change as an anthropogenic phenomenon resulting from the increased greenhouse gas emissions.
13.1.3	The learner knows which human activities – on a global, national, local and individual level – contribute most to climate change.
13.1.4	The learner knows about the main ecological, social, cultural and economic consequences of climate change locally, nationally and globally and understands how these can themselves become catalysing, reinforcing factors for climate change.
13.1.5	The learner knows about prevention, mitigation and adaptation strategies at different levels (global to individual) and for different contexts and their connections with disaster response and disaster risk reduction.
13.2.1	The learner is able to explain ecosystem dynamics and the environmental, social, economic and ethical impact of climate change.
13.2.2	The learner is able to encourage others to protect the climate.
13.2.4	The learner is able to understand their personal impact on the world's climate, from a local to a global perspective.
13.2.5	The learner is able to recognize that the protection of the global climate is an essential task for everyone and that we need to completely re-evaluate our worldview and everyday behaviours in light of this.
13.3.3	The learner is able to anticipate, estimate and assess the impact of personal, local and national decisions or activities on other people and world regions.
13.3.4	The learner is able to promote climate-protecting public policies.

5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of "pre-requisites, co-requisites and anti-requisites".

5.1. Pre-requisites

Not applicable

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENS310 and ENS320

5.4. Specific assumed prior knowledge and skills (where applicable)

A variety of online resources have been produced or curated to support your learning, enable you to succeed in the course, and prepare you for your career in environmental management, environmental science, planning, and community development. Resources include: detailed instructions and grading rubrics, relevant readings, library reserve materials, instructional and topic related pre-recorded video and audio material, recorded interviews with experts across a range of relevant disciplines.

5.5. Microcredential Information

Not applicable

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

The delivery approach to the course is highly interactive. Course materials will include studio-recorded instructional and task guidance videos with examples so that you can evaluate your own progress. You'll also receive early and ongoing formative feedback during the workshops and computer labs. Class-level feedback will normally take the form of instructor observations on how the whole class is progressing, guidance on common pitfalls and strategies to excel in the tasks, and responses to student questions. Constructive peer-to-peer feedback will also be encouraged, and we'll help to facilitate that. You will be provided with detailed instructions and marking rubrics which will be explained at the start of the task. To ensure you receive regular and timely individual feedback, you'll have ongoing interactions with the instructors during the workshops in relation to your work as you are completing it rather than by submitting and receiving written feedback on drafts. You will however receive written summative feedback on your graded work so that you can improve your submissions from task to task. The instructors will also be available during office hours or similar to help you succeed in the course.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Artefact - Technical and Scientific	Individual	30%	1000 words equivalent	Week 4	Online Submission
All	2	Case Study	Individual	30%	2000 words	Week 8	Online Submission
All	3	Plan	Individual	40%	2000 words	Exam Period	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Climate scenario poster

GOAL:	The goal of this task is to develop foundational knowledge of the process of generating and using climate scenarios and practical skills in communicating complex information to non-scientific audiences.
PRODUCT:	Artefact - Technical and Scientific
AUTHORSHIP STATEMENT:	
FORMAT:	The goal of this task is to develop foundational knowledge of the process of generating and using climate scenarios and practical skills in communicating complex information to non-scientific audiences.

CRITERIA:

No.		Learning Outcome assessed
1	Depth and breadth of knowledge demonstrated in relation to main carbon sources and sinks, the characteristics of different greenhouse gases and their influence on global average temperatures, precipitation, and ocean acidity.	1
2	Appropriateness and accuracy of climate change scenario modelling method and quality and insightfulness of model outputs interpretation.	1
3	Depth and breadth of creative communication skills and quality of technical skills apparent in the poster.	1

GENERIC SKILLS:	Communication, Problem solving, Applying technologies, Information literacy

All - Assessment Task 2: Climate change vulnerability case study

GOAL:	The goal of this task is to help you to gain foundational knowledge and technical skills to really dig into the impacts of changes in climate conditions on people and nature at a landscape level and economic sector level, identify a range of coping and adaptation strategies, and evaluate their suitability against commonly accepted adaptation principles using techniques such as multi-criterion assessment.
PRODUCT:	Case Study
AUTHORSHIP STATEMENT:	
FORMAT:	This is an engaging simulation-based task where you will be part of an interdisciplinary environmental management consulting group working on a simulated project. Your team will be provided with background information for the scenario. You'll model or research impacts of changes in temperature, precipitation, storm conditions, and sea-level rise and evaluate different possible adaptive responses against commonly accepted adaptation principles using techniques such as multi-criterion assessment. You will produce a consulting report in a style common to this type of work to help you build your knowledge and prepare you for a career in environmental management, planning, international development and similar fields.
CRITERIA:	

No.		Learning Outcome assessed
1	Depth and breadth of analytic skills associated with investigating hazards and potential impacts of different climate change related conditions on people, the economy, and the environment at a landscape level.	2 4
2	Depth and breadth of analytic skills associated with identifying and evaluating the suitability of different adaptation options using tools such as multi-criterion analysis analysis	2 4
3	Quality of communication skills in conveying the outcomes of the investigation in a style and format consistent with the context and audience.	2
4	Proficiency in acquiring and referencing knowledge from various sources.	2

GENERIC SKILLS:	Communication, Problem solving, Applying technologies, Information literacy

All - Assessment Task 3: Global emissions reduction plan for UNFCCC

GOAL:	The goal of this task is to extend your climate modelling skills to more sophisticated global climate modelling while providing you with sound foundational knowledge of the global climate change institutional and policy framework. You will develop an understanding of the major issues and challenges associated with negotiating an international allocation of emission reduction targets by gas, time, and region, that is effective in avoiding catastrophic climate change but also informed by ethics and environmental justice issues, technology transfer barriers, special interest influences, poverty alleviation priorities, and trade-offs between current and future generations.
PRODUCT:	Plan
AUTHORSHIP STATEMENT:	
FORMAT:	In this simulation task, you will take on the role of Special Advisor to the Chair of the United Nations Framework Convention on Climate Change. You will be responsible for using actual global emissions data and the Model for the Assessment of Greenhouse Gas Induce Climate Change (MAGGIC) used by the IPCC to produce a plan for cutting global emissions by gas, region, and year sufficient to avoid a 2C global average temperature change. The plan will include: technical outputs and diagrams; strategies to address issues of equity, historic responsibility and future emissions growth; technology transfer and funding arrangements; and other features you see fit to include, such that it can be presented for discussion by 165 signatories to the UNFCCC at the next Convention of the Parties (COP) meeting. Effectively, you will produce a plan to save the world as we know it.
CRITERIA:	

No.		Learning Outcome assessed
1	Extent of ability of technical skills to access and manipulate emissions data using spreadsheets and more advanced climate modelling software to produce future climate scenarios at a global level.	1 3
2	Depth and breadth of analytic skills associated with applying knowledge of greenhouse gas sources and characteristics in global climate modelling.	1 3
3	Depth and breadth of analytic skills associated with identifying and evaluating the suitability of different mitigation options against a range of established criteria.	3 4
4	Quality of communication skills in conveying the outcomes of the investigation and associated plan in a style and format consistent with the context and audience.	1 2 3 4

GENERIC SKILLS:	Communication, Problem solving, Applying technologies, Information literacy

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Student workload is calculated at 12.5 learning hours per one unit.

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

> There are no required/recommended resources for this course.

8.2. Specific requirements

The course utilises SimCLIM and MAGICC climate change modelling software. The software is only available in specific Sippy Downs and Moreton Bay computer labs.

9. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the health and safety risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

10.2. Assessment: Additional Requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:
(a) The final mark is in the percentage range 47% to 49.4%; and
(b) The course is graded using the Standard Grading scale

Eligibility for Supplementary Assessment Your eligibility for supplementary assessment in a course is dependent of the following conditions applying: The final mark is in the percentage range 47% to 49.4% The course is graded using the Standard Grading scale You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:
(a) One day: deduct 5%;
(b) Two days: deduct 10%;
(c) Three days: deduct 20%;
(d) Four days: deduct 40%;
(e) Five days: deduct 60%;
(f) Six days: deduct 80%;
(g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:
Less than 15 minutes: No penalty
From 15 minutes to 30 minutes: 20% penalty
More than 30 minutes: 100% penalty

10.4. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.5. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.6. General Enquiries

For course-specific questions, contact your teaching staff or Course Coordinator.

For other enquiries or to access support, please contact Student Central:

- UniSC Student Central
- UniSC Adelaide Student Central