

# EART 2001 CLIMATE CHANGE SCIENCE

**Credit Points** 10

**Legacy Code** 300837

**Coordinator** Amy-Marie Gilpin ([https://directory.westernsydney.edu.au/search/name/Amy-Marie Gilpin/](https://directory.westernsydney.edu.au/search/name/Amy-Marie%20Gilpin/))

**Description** A factual understanding of the energy balance of the globe, how this impacts on climate and how climate has varied in the past, is essential for any person working in the climate change area. This subject will introduce students to the concept of energy balance and climate, our understanding of how climate works, and how it has changed through time. Topics in basic atmospheric science will give students a critical understanding of current environmental concerns and debates about radiative forcing (the greenhouse effect), climate change, ozone depletion, photochemical pollution and acid precipitation.

**School** Science

**Discipline** Atmospheric Sciences

**Student Contribution Band** HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 2 subject

**Equivalent Subjects** LGYA 6248 - Atmospheric Science

## Restrictions

Successful completion of 60 credit points

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Describe the composition and structural characteristics of the atmosphere as they relate to the energy balance of the Earth, including solar radiation, aerosols, particulates, water vapour, ozone, and greenhouse gasses.
2. Describe the major process components of the climate system, including elevated CO<sub>2</sub>, temperature, precipitation, evaporation, transpiration, and wind, evaluate terrestrial feedbacks to climate change and how these may act to modify the rate of future change.
3. Describe the evidence for past climates (paleoclimates), including techniques to reconstruct climate through direct and indirect methods.
4. Explain the major theories and concepts of global climate change, including model scenarios of future climate regimes.
5. Evaluate the impact of climate change on physiology, growth, productivity and species interactions in biological systems. Understand the processes driving climate change impacts on ecosystem structure, diversity and function.
6. Evaluate human impacts - land use changes, industrial pollution, rapid population growth - on climate variables (CO<sub>2</sub>, temperature, precipitation) and their potential impact on biological and socio-economic systems, including indigenous culture.
7. Use spreadsheets and statistical tools in analytical programs to analyse and graph data, in order to generate appropriately conclusions.

8. Communicate findings correctly in oral or written form using an appropriate style, accessing scientific literature to place findings into context.

## Subject Content

1. Introduction to atmospheric science, the structure and composition of the atmosphere.
2. The Earth's energy balance - the role of water vapour, aerosols, particles and gasses.
3. Understanding processes driving the climate system.
4. Relationships between atmospheric composition and climate - historical evidence.
5. Introduction to climate models and climate predictions.
6. Impacts of elevated carbon dioxide and climate change on plant physiology and interactions among plants, animals and microbes.
7. Effects of climate change on natural and managed ecosystems, including agriculture.
8. The carbon cycle and ecosystem feedbacks.
9. Socio-economic drivers of (and responses to) climate change, including population growth, urbanisation and land use change.

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Report	800 words	20	N	Individual
Report	1,500 words	20	N	Individual
Presentation	4-5 minutes per person for talk, 20 slides maximum per group	20	N	Group/ Individual
Quiz	4 x 30 minutes	40	N	Individual

## Prescribed Texts

- Bloom, Arnold (2010) Global Climate Change: Convergence of Disciplines. Sinauer Associates, Inc (publisher) ISBN 978-0-87893-027-2 (pbk)

## Teaching Periods

### Autumn (2022)

#### Hawkesbury

##### Day

**Subject Contact** Sally Power ([https://directory.westernsydney.edu.au/search/name/Sally Power/](https://directory.westernsydney.edu.au/search/name/Sally%20Power/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=EART2001\\_22-AUT\\_HW\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=EART2001_22-AUT_HW_D#subjects))

### Autumn (2023)

#### Hawkesbury

##### On-site

**Subject Contact** Sally Power ([https://directory.westernsydney.edu.au/search/name/Sally Power/](https://directory.westernsydney.edu.au/search/name/Sally%20Power/))

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=EART2001\\_23-AUT\\_HW\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=EART2001_23-AUT_HW_1#subjects))