



# ENVS216

## The Atmospheric Environment

S1 External 2017

*Dept of Environmental Sciences*

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#### **Disclaimer**

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## General Information

### Unit convenor and teaching staff

Convenor

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Credit points

3

Prerequisites

ENVE117 or ENV5117 or GEOS117 or GEOS112 or 3cp in PHYS units at 100 level

Corequisites

Co-badged status

Unit description

This unit provides an introduction to the major atmospheric, oceanic and other environmental processes that are responsible for our weather and climate. The unit builds on themes introduced in ENV5117 and GEOS112 with a focus on Australian region weather and climate. Severe weather events such as tropical cyclones, thunderstorms, hail and tornadoes are discussed. This unit is offered under the flipped classroom model, in which online training modules come with the textbook and those built within iLearn are available to let students obtain the background knowledge on the topics at their own pace. On-campus students participate in practicals and group discussions with instructors, while external students are able to complete the same practicals in online mode. Assessment tasks in the unit include regular assignments, project-based reports and formal examination. One of the tasks is to participate in an open weather forecast game created by the Australian Meteorological and Oceanographic Society. While mathematical skills at HSC level are beneficial to completing some of the assessment tasks in the unit and will be introduced in the unit, conceptual understanding of weather and climate phenomena is emphasized.

## 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:

- Understand the fundamental principles on which meteorology and climatology are based
- Understand the important meteorological and oceanic processes which shape weather and climate
- Recall and appropriately utilise meteorological and climatological terminology
- Recognise and appropriately utilise basic equations which govern weather and climate
- Apply basic concepts and equations to practical (real world) problems
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
- Analyse and evaluate categorical and numerical data (e.g., interpreting environmental data)
- Conceptualise and apply simple models related to weather and climate processes

## General Assessment Information

### Deadlines, extensions and penalties

Deadlines set for assignment submissions will not be altered except in exceptional circumstances. In all cases, extensions must be applied for before the due date and must be supported with appropriate documentation (medical certificate, counsellor's certificate, statutory declaration). Where an unavoidable disruption warrants an extension, you may also wish to consider applying for Disruption to Studies. Requests for disruption to studies are submitted via [ask.mq.edu.au](http://ask.mq.edu.au). Instructions on how to submit your disruption to studies request can be found here: <http://ask.mq.edu.au/kb.php?record=ce7c4e38-4f82-c4d7-95b1-4e2ee8fd075f>

Extensions will not be granted in cases of poor time management. Only the Unit Convenor can authorise extensions. Late submissions will not be accepted once marked assignments have been returned unless otherwise approved by the Unit Convenor.

Late assignments will incur a late penalty of 10% of the total mark per day. Weekends will be counted as 2 days. Penalties will also be incurred for plagiarism, that is, the use of another persons' work and presentation as your own (see University Policies and [http://www.mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://www.mq.edu.au/policy/docs/academic_honesty/policy.html)).

## Grading

Your assignment will be marked, commented upon and returned to you via Turnitin and Grademark. Grading is conducted in line with the universities grading policy (<http://www.mq.edu.au/policy/docs/grading/policy.html>)

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Practical Tasks</u></a>	30%	No	1 week after practical class
<a href="#"><u>Weather Tipping Competition</u></a>	30%	No	Week 11
<a href="#"><u>Examination</u></a>	40%	No	TBA

### Practical Tasks

Due: **1 week after practical class**

Weighting: **30%**

You are required to complete and submit an assessable task for 10 of the practical classes. Instructions for this task will be provided each week in class and via iLearn. Practical tasks contribute a total of 30% towards your final grade, meaning that each task is worth 3%.

On successful completion you will be able to:

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- Recognise and appropriately utilise basic equations which govern weather and climate
- Apply basic concepts and equations to practical (real world) problems
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Analyse and evaluate categorical and numerical data (e.g., interpreting environmental data)

### Weather Tipping Competition

Due: **Week 11**

Weighting: **30%**

The Weather Tipping Competition (<http://tipping.amos.org.au/dist/pages/index.php#static/home>)

is a game open to the public organised by the Australian Meteorological and Oceanographic Society (AMOS). The game will start from early April and last for about 10 weeks (or rounds). Students are asked to participate in this game, but instead of just submitting your forecast (of temperatures and rainfall) you are requested to document your reasonings behind the forecasts based on the concepts learnt from this unit. A case study on a weather system using meteorological analysis techniques is also required in this report. A more detailed description of this assessment will be released.

On successful completion you will be able to:

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- Recall and appropriately utilise meteorological and climatological terminology
- Apply basic concepts and equations to practical (real world) problems
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
- Analyse and evaluate categorical and numerical data (e.g., interpreting environmental data)
- Conceptualise and apply simple models related to weather and climate processes

## Examination

Due: **TBA**

Weighting: **40%**

Exam date, structure, etc., will be available later in the semester. The exam is run through the formal university examination process. The exam structure may take the form of numerical, short answer and/or essay questions. You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in draft form approximately 8 weeks before the commencement of the examinations and in final form approximately 4 weeks before the commencement of the examinations.

(<http://www.timetables.mq.edu.au/exam>) The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. You are advised that it is Macquarie University policy not to set early examinations. All students are expected to ensure that they are available until the end of the teaching semester; that is the final day of the official examination period.

On successful completion you will be able to:

- Understand the fundamental principles on which meteorology and climatology are based

- Understand the important meteorological and oceanic processes which shape weather and climate
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## Delivery and Resources

The timetable for classes can be found on the University web site at:

<http://www.timetables.mq.edu.au/>

### Lectures

There is 1 x 2-hour lecture each week in E7B T3:

- Tuesday 4:00pm - 6:00pm

Attendance is strongly recommended; however, the lecture will be recorded by Echo 360 for iLecture (links from iLearn).

### Practicals

There is 1 x 2-hour compulsory practical each week. You are required to register for one of the following timeslots:

- Monday 4:00pm - 6:00pm (E5A 270)
- Tuesday 8:00am - 10:00am (E5A 260)
- Tuesday 11:00am - 1:00pm (E5A 270)
- Tuesday 2:00pm - 4:00pm (E5A 260)

### iLearn

The iLearn platform is central to the delivery of course material, assessments and announcements: <http://ilearn.mq.edu.au>

### Textbook and resources

The primary textbook for ENV5216 is **Aguado, E., and J. E. Burt, 2015: Understanding Weather and Climate (7th global edition, ISBN 978-0-321-98730-3), Pearson, 596 pp.** It is essential for you to obtain a copy of this textbook together with an access card to the Pearson MyLab and Mastering online system (<http://www.pearsonmylabandmastering.com/au/>). They will

be sold as a package in the Co-op Bookstore.

We will also make use of materials from the MasteringMeteorology website to enhance your understanding the textbook, and there are also quiz questions for you to self test your progress.

When we discuss weather systems and climate specific to the Australian region, the useful reference book is Sturman, A., and N. J. Tapper, 2006: The Weather and Climate of Australia and New Zealand (2nd edition), Oxford University Press, 541 pp, which is accessible from the University Library.

## Unit Schedule

Week	Date	Lecture Title	Practical
1	28-Feb	Introduction to the Atmospheric Environment (SB)	No Practical
2	7-Mar	Atmosphere Composition and Solar Radiation (SB)	Weather Data
3	14-Mar	Energy Balance and Temperature (SB)	Energy
4	21-Mar	Atmospheric Pressure and Wind (SB)	Pressure and Wind Weather Tipping Assignment set
5	28-Mar	Atmospheric Moisture (KC)	Atmospheric Moisture
6	4-Apr	Cloud Development and Forms (KC)	Cloud Formation
7	11-Apr	Precipitation Processes (KC)	Precipitation Processes
<b>Session 1 recess: 17<sup>th</sup> April to 28<sup>th</sup> April</b>			
8	2-May	General Circulation (SB)	ENSO and Australian rainfall
9	9-May	Air Masses and Fronts (SB)	Forecasting Methods
10	16-May	Mid-latitude Cyclones (KC)	Mid-latitude Cyclones
11	23-May	Lightning, Thunder and Tornadoes (KC)	Thunderstorms Weather Tipping Assignment Due: 5pm 26 <sup>th</sup> May
12	30-May	Tropical Storms (KC)	Tropical Cyclones
13	6-Jun	Weather Forecasting and Course Summary (SB)	No Practical

## 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](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy [http://mq.edu.au/policy/docs/assessment/policy\\_2016.html](http://mq.edu.au/policy/docs/assessment/policy_2016.html)

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public [http://www.mq.edu.au/policy/docs/complaint\\_management/procedure.html](http://www.mq.edu.au/policy/docs/complaint_management/procedure.html)

Disruption to Studies Policy (in effect until Dec 4th, 2017): [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html)

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

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/](https://students.mq.edu.au/support/student_conduct/)

## Results

Results shown in *iLearn*, 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](http://ask.mq.edu.au).

## 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](http://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](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

### Learning outcomes

- Recognise and appropriately utilise basic equations which govern weather and climate
- Apply basic concepts and equations to practical (real world) problems
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
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- Conceptualise and apply simple models related to weather and climate processes

### Assessment tasks

- Practical Tasks
- Weather Tipping Competition
- Examination

### Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to

demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

## **Learning outcomes**

- Recognise and appropriately utilise basic equations which govern weather and climate
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
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## **Assessment tasks**

- Practical Tasks
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## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## **Learning outcomes**

- Apply basic concepts and equations to practical (real world) problems
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
- Conceptualise and apply simple models related to weather and climate processes

## **Assessment tasks**

- Practical Tasks
- Weather Tipping Competition
- Examination

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

### Learning outcomes

- Understand the fundamental principles on which meteorology and climatology are based
- Understand the important meteorological and oceanic processes which shape weather and climate
- Recall and appropriately utilise meteorological and climatological terminology
- Recognise and appropriately utilise basic equations which govern weather and climate
- Apply basic concepts and equations to practical (real world) problems
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
- Analyse and evaluate categorical and numerical data (e.g., interpreting environmental data)
- Conceptualise and apply simple models related to weather and climate processes

### Assessment tasks

- Practical Tasks
- Weather Tipping Competition
- Examination

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

## Learning outcomes

- Understand the fundamental principles on which meteorology and climatology are based
- Understand the important meteorological and oceanic processes which shape weather and climate
- Recall and appropriately utilise meteorological and climatological terminology
- Recognise and appropriately utilise basic equations which govern weather and climate
- Apply basic concepts and equations to practical (real world) problems
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- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology
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## Assessment tasks

- Practical Tasks
- Weather Tipping Competition
- Examination

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

## Learning outcomes

- Recognise and appropriately utilise basic equations which govern weather and climate
- Apply basic concepts and equations to practical (real world) problems
- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
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- Conceptualise and apply simple models related to weather and climate processes

## Assessment tasks

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- Examination

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

## Learning outcomes

- Acquire field skills to collect data by measurement or observation (e.g., familiarity with the use of basic meteorological instruments)
- Conceptualise and apply simple models related to weather and climate processes

## Assessment tasks

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- Weather Tipping Competition
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## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

## Learning outcomes

- Recall and appropriately utilise meteorological and climatological terminology
- Apply basic concepts and equations to practical (real world) problems
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology

## Assessment tasks

- Practical Tasks
- Weather Tipping Competition
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## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

## Learning outcomes

- Understand the important meteorological and oceanic processes which shape weather and climate
- Recall and appropriately utilise meteorological and climatological terminology
- Critically evaluate scientific literature in the fields of meteorology, oceanography and climatology

## Assessment tasks

- Practical Tasks
- Weather Tipping Competition
- Examination