



The University of Southern Queensland

Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.
Please consult the web for updates that may occur during the year.

Description: Advanced Climatology

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
CLI	3110	74655	1, 2008	ONC	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS002
Student contribution band:	2
ASCED code:	010799

STAFFING

Examiner: Joachim Ribbe

REQUISITES

Pre-requisite: CLI1110 and (CLI2110 or PHY1102) and MAT2100

RATIONALE

The study of Advanced Climatology will be paramount for any student pursuing detailed and thorough knowledge of important topics in climatology. This course provides a particularly thorough and relatively advanced insight into key climatic indicators such as El Nino, La Nina, The Southern Oscillation, the Walker Circulation, and feedback processes. This course is especially necessary for those students proceeding to statistical analyses of climate mechanisms and their impacts.

SYNOPSIS

This course encourages students to appreciate the level of detailed knowledge required in a thorough study of climatology. It provides a particularly thorough and relatively advanced insight into key climatic indicators such as El Nino, La Nina, The Southern Oscillation, the Walker Circulation, and feedback processes. These systems are the major ocean/atmosphere systems responsible for much of the world's climatic variability. Additionally the course will provide an understanding of the causes and processes involved in decadal and interdecadal variability in the world's oceans and atmosphere. These low frequency modes are believed to play a major role in causing long-term droughts or periods of excess rainfall around the world. Finally, the course will introduce students to key components of the oceanic systems. Access to the internet is required.

OBJECTIVES

On completion of this course students will be able to:

1. explain the detailed workings of key climatic mechanisms such as El Nino/La Nina, The Southern Oscillation, The QBO, The North Atlantic Oscillation, and other globally important climatic systems (Assignment);

2. apply basic principles of physics to the areas of the ocean atmospheric structures (Modules 1-10);
3. explain and apply climate forecasting models and systems (Exam);
4. explain the methods and value of integrating climate forecasting systems with cropping and pasture systems (Exam).

TOPICS

	Description	Weighting (%)
1.	Circulation systems in the tropics	10.00
2.	Major non-seasonal variations: MJO, QBO, ENSO, ACW, decadal, interdecadal - mechanisms and impacts.	15.00
3.	Seasonal patterns: tropical disturbances: easterly waves, tradewinds, 'the monsoon', tropical cyclones midlatitude disturbances: frontogenesis, cyclogenesis.	15.00
4.	Methodology used in the identification of atmospheric and oceanic patterns.	10.00
5.	Climate forecasting: forecasting rainfall and temperature, forecasting ENSO, use of General Circulation Models (GCMs), statistical techniques in climate forecasting.	15.00
6.	Oceanic feedback processes, El Nino within a continuum, Kelvin and Rossby Waves, 'The Delayed Action Oscillator'. The Global ENSO Wave.	15.00
7.	Oceans: Vertical temperature structure, variability, salinity, density, circulation.	10.00
8.	Climate applications: Introduction to integrating climate with agricultural systems.	10.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

McGregor, G R and Nieuwolt, S 1998, *Tropical Climatology: an introduction to the climates of the low attitudes*, 2nd edn, John Wiley & Sons, New York.

Sturman, A P and Tapper, N J 2005, *The Weather and Climate of Australia and New Zealand*, 2nd edn, Oxford University Press, Melbourne.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Allan, R, Lindesay, J & Parker, D 1996, *El Nino, Southern Oscillation and Climatic Variability*, CSIRO Publishing, Victoria.

American Meteorological Society , , *Journal of Climate*, QCCA Climate Library.

Glantz, M H (ed) 1994, *Drought follows the Plow: cultivating marginal areas*, Cambridge University Press, New York.

Graham, NE & White, WB 1988, The El Nino cycle: a natural oscillator of the Pacific ocean-atmosphere system, *Science*, Vol 240, no. , pp1293-1302.

Hammer, G L, Holzworth, D P & Stone, R C 1996, The value of skill in seasonal climate forecasting to wheat crop management in a region with high climatic variability, *Australian Journal of Agricultural Research*, Vol 47, no.5, pp717-737.

Hammer, G L, Nicholls, N & Mithcell, C (eds) 2000, *Applications of Seasonal Climate Forecasting in Agricultural and Natural Ecosystems - The Australian Experience*, Kluwer Academic, The Netherlands.

Navarra, A (ed) 1999, *Beyond El Nino: Decadal and Interdecadal Climate Variability*, Springer-Verlag, Berlin, New York.

Partridge, I (ed) 1994, *Will it Rain? The Effects of the Southern Oscillation and El Nino on Australia*, 2nd edn, Dept of Primary Industries, Brisbane.

(also QCCA Climate Library, also Client Services Section, DPI, Tor Street Toowoomba 551.6594WIL)

Philander, S G 1990, *El Nino, La Nina and the Southern Oscillation*, Academic Press Inc, San Diego.

Royal Meteorological Society , , *International Journal of Climatology*, QCCA Climate Library.

Stone, RC, Hammer, GL & Marcussen, T 1996, Prediction of global rainfall probabilities using phases of the Southern Oscillation Index, *Nature*, Vol 384, no. , pp252-255.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	2.00
Lectures	26.00
Private Study	115.00
Tutorials	26.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT	100.00	20.00	28 Mar 2008
MODULES 1-10	100.00	20.00	23 May 2008
2HR RESTRICTED EXAMINATION	100.00	60.00	END S1 (see note 1)

NOTES

1. Examination dates will be available during the Semester.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements for students to complete each assessment item satisfactorily:
To satisfactorily complete an assessment item a student must achieve at least 50% of the marks or a grade of at least C-. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.
- 3 Penalties for late submission of required work:
If students submit assignments after the due date without (prior) approval of the examiner then a penalty of 5% of the total marks gained by the student for the assignment may apply for each working day late up to ten working days at which time a mark of zero may be recorded.. No assignments will be accepted after model answers have been posted.
- 4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade a student must achieve at least 50% of the total weighted marks available for the course.
- 5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the weighted aggregate of the marks obtained for each of the summative assessment items in the course.
- 6 Examination information:
In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators which cannot hold textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination. With the Examiner's approval, candidates may, take an appropriate non- electronic translation dictionary (but not technical dictionaries) into the examination. This will be subject to perusal and, if it is found to contain annotations or markings that could give the candidate an unfair advantage, it may be removed from the candidate's possession until the appropriate disciplinary action is completed.
- 7 Examination period when Deferred/Supplementary examinations will be held:

Any Deferred or Supplementary examinations for this course will be held during the next examination period.

8 University Regulations:

Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

ASSESSMENT NOTES

- 9 The due date for assessments is the date by which a student must despatch an assignment to the USQ. the onus is on the student to provide proof of the despatch date if requested by the Examiner. Students must retain a copy of each item submitted for assessment. this must be produced within 48 hours if required by the Examiner.