Description: Advanced Climatology

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
<th>Units</th>
<th>Campus</th>
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<tr>
<td>CLI</td>
<td>3110</td>
<td>62790</td>
<td>1, 2007</td>
<td>EXT</td>
<td>1.00</td>
<td>Toowoomba</td>
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Academic group: FOSCI
Academic org: FOS002
Student contribution band: 2
ASCED code: 010799

STAFFING
Examiner: Joachim Ribbe
Moderator: Alfio Parisi

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 1-20);
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**

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


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.


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


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


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
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<tr>
<td>Examinations</td>
<td>2.00</td>
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<tr>
<td>Private Study</td>
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ASSESSMENT DETAILS

<table>
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<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
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<tbody>
<tr>
<td>ASSIGNMENT</td>
<td>100.00</td>
<td>20.00</td>
<td>27 Apr 2007</td>
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<tr>
<td>MODULES 1-20</td>
<td>100.00</td>
<td>20.00</td>
<td>15 Jun 2007</td>
</tr>
<tr>
<td>2HR RESTRICTED EXAMINATION</td>
<td>100.00</td>
<td>60.00</td>
<td>END S1 (see note 1)</td>
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NOTES

1. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

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 then a penalty of 10% of the total marks available for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:
   To be assured of receiving a passing grade a student must submit all of the assessment items and achieve at least 50% of the available marks for each of those items. Should a student gain more than 50% of the total weighted marks for the course but fail to achieve 50% of the available marks for an assessment item, they will be awarded a supplementary examination and/or assigned additional work to allow them to demonstrate to the Examiner that they have achieved the required standard in the objectives assessed by that assessment item.

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 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 an assignment is the date by which a student must despatch the 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. If requested by the Examiner, students will be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request being made.