Description: Physics of Climate

Academic group: FOSCI
Academic org: FOS002
Student contribution band: 2
ASCED code: 010701

STAFFING
Examiner: Joachim Ribbe
Moderator: Roger Stone

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

RATIONALE
Students undertaking climatological studies need a sound basis of the science of the climate system, its compositions, and its physical properties. The course is designed to provide the student with an understanding of the climate machine.

SYNOPSIS
The course describes the physical processes underlying the behaviour of the atmosphere and ocean, and the way the atmosphere and ocean interact. Topics covered include the physical laws involved in climate, weather, atmospheric and oceanic stability and instability, synoptic-scale processes, energy in the climate system, and the hydrological cycle.

OBJECTIVES
On successful completion of this course students will be able to:

1. demonstrate an understanding of and describe the basic physical principles and processes underlying atmospheric processes, weather systems and climate.

TOPICS

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tbody>
<tr>
<td>1. Physical laws involved in weather and climate: equations of state, thermodynamics, hydrostatic, conservation of mass</td>
<td>20.00</td>
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<tr>
<td>2. Atmospheric stability and instability: lapse rates, inversions, aerological diagram</td>
<td>20.00</td>
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</tbody>
</table>
3. Synoptic-scale processes: convergence, divergence, vorticity, thickness. 20.00
4. Energy in the Atmosphere and Ocean: radiation balance, radiation laws, solar radiation, terrestrial radiation, radiation balance, evaporation, energy balances. 20.00
5. The Water Cycle: Humidity: vapour pressure, dewpoint, mixing ratios; Clouds: condensation, types of clouds, nucleation, electricity; Rainfall: processes, intensity, variability, surface runoff. 20.00

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).

Hartmann, D. 1994, *Global Physical Climatology*, Academic Press,

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.


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
</tr>
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<tbody>
<tr>
<td>Examinations</td>
<td>3.00</td>
</tr>
<tr>
<td>Lectures</td>
<td>26.00</td>
</tr>
<tr>
<td>Private Study</td>
<td>115.00</td>
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<tr>
<td>Tutorials</td>
<td>26.00</td>
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</table>
ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNMENT</td>
<td>100.00</td>
<td>20.00</td>
<td>15 Apr 2005</td>
</tr>
<tr>
<td>MODULES 1-20</td>
<td>100.00</td>
<td>20.00</td>
<td>03 Jun 2005</td>
</tr>
<tr>
<td>3 HR RESTRICTED EXAM</td>
<td>100.00</td>
<td>60.00</td>
<td>END S1</td>
</tr>
</tbody>
</table>

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 complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available for each assignment. To complete the examination satisfactorily, students must obtain at least 50% of the marks available for the examination.

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 achieve at least 50% of the available weighted marks for the summative assessment items.

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; English translation dictionaries (but not technical dictionaries); Translation dictionary. 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 Students who obtain an overall passing mark, but who do not perform satisfactorily in an examination, may, at the discretion of the examiner, be granted a supplementary examination. Students will be granted a deferred examination only if they perform satisfactorily in all other assessment items.

10 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.