



The University of Southern Queensland

Course specification

Description: Remote Sensing and Meteorology						
Subject	Cat-nbr	Class	Term	Mode	Units	Campus
PHY	1102	45316	2, 2005	ONC	1.00	Toowoomba

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

STAFFING

Examiner: Jeff Sabburg

Moderator: Alfio Parisi

RATIONALE

Remote sensing is being applied in an ever-increasing range of scientific and GIS areas. An understanding of the basic principles of both remote sensing and meteorology will greatly enhance the students realisation of the role of remote sensing in evaluating the changes to the world environment. This course is of interest to students studying climatology, physics, environmental engineering, science education as well as professional science teachers.

SYNOPSIS

This course provides a basic understanding of remote sensing and meteorology which is necessary in evaluating global change in the world environment. No prior knowledge of mathematics or physics is required. Concepts covered in the course include the physics of data acquisition, image processing, remote sensing applications, physics of the atmosphere, synoptic and sub-synoptic-scale processes.

OBJECTIVES

On completion of this course students will be able to:

1. describe basic principles of physics in the areas of remote sensing and meteorology;
2. perform experiments which demonstrate and reinforce aspects of the theory using the appropriate equipment safely;
3. effectively communicate their knowledge of Environmental Physics.

TOPICS

Description	Weighting (%)
1. Measurement and Uncertainty, Weather Forecasting and Observation.	8.00

2.	Electromagnetic radiation Maxwell's equations, electromagnetic spectrum, energy levels, image characteristics, energy interactions in the atmosphere.	17.00
3.	Data acquisition - Sensors, Landsat, SPOT, NOAA satellites, multispectral and thermal scanning.	11.00
4.	Atmospheric Dynamics, structure and composition.	8.00
5.	Atmospheric Radiation - energy budget, Greenhouse effect and global warming.	16.00
6.	Sub-synoptic scale - thunderstorms, tropical cyclones and micro-meteorology.	16.00
7.	Image processing - Image structure, image processing systems, image restoration, image enhancement, information extraction/classification.	12.00
8.	Applications - resource exploration, environmental and land use applications, meteorological applications, natural hazards and radar remote sensing.	12.00

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).

Mason, N and Hughes, P 2001, *Introduction to Environmental Physics: planet earth, life and climate*, Taylor and Francis, London.

SABBURG, J 2005, *Practical Manual for Remote Sensing and Meteorology*, University of Southern Queensland, Toowoomba.

SABBURG, J 2005, *Intro/Study Book and CD*, Distance Education, University of Southern Queensland, Toowoomba.

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.

Andrews, DG 2000, *An introduction to Atmospheric Physics*, Cambridge University Press, New York.

Boeker, E & van Grandelle, R 1999, *Environmental Physics*, 2nd edn, Wiley,

Boeker, E & van Grandelle, R 2001, *Environmental Science: Physical Principles and Applications*, Wiley,

Crowder, B 2000, *The Wonders of the Weather*, Bureau of Meteorology, Melbourne.

Linacre, E and Geerts, B 1997, *Climates & Weather Explained*, Routledge, New York.

Mather, P 1999, *Computer Processing of Remotely Sensed Images*, 2nd edn, John Wiley, New York.

Muller, JP 1988, *Digital Image Processing in Remote Sensing*, Taylor and Francis, London.

Royal Meteorology Society , , *Weather*, Vol 551, no.6, p1.

Sturman, AP & Tapper, NJ 1996, *The Weather and Climate of Australia and New Zealand*, Oxford University Press, Melbourne.

World Meteorological Organization 1983, *Guide to Instruments and Methods of Observation*, 5th edn, World Meteorological Organization, Geneva, Vol 8.

(551.5 GUI and Physics Lab)

World Meteorological Organization 1987, *International Cloud Atlas*, World Meteorological Organization, Geneva, Vol 2.

(551.576 WOR)

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assignments	5.00
Examinations	3.00
Lectures	24.00
Practical Experience or Directed	12.00
Private Study	102.00
Report Writing	24.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT	100.00	10.00	02 Sep 2005
PRACTICAL REPORTS	100.00	20.00	21 Oct 2005
3HR RESTRICTED EXAM	100.00	70.00	END S2 (see note 1)

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 the examination satisfactorily, students must obtain at least 50% of the marks available for the examination. To complete the practical component satisfactorily, students must submit 80% of the nominated practical reports and obtain at least 50% of the marks available for each report submitted. Students must satisfy Objective 2 by including signed results with their laboratory reports.

- 3 Penalties for late submission of required work:
If students submit assignments/laboratory reports after the due date without prior approval then a penalty of up to 20% of the total marks gained by the student for the assignment/laboratory reports 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 summative assessment items, achieve at least 50% in the examination and 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); Formula sheets; Translation dictionary. Students whose first language is not English, may, with the Examiner's approval, take an appropriate non- electronic translation dictionary into the examination. Students who wish to use a translation dictionary MUST request and receive written approval from the Examiner at least one week before the examination date. Translation dictionaries will be subject to perusal and may be removed from the candidate's possession until appropriate disciplinary action is completed if found to contain material that could give the candidate an unfair advantage.
- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.
- 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 an assignment/laboratory report 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. The examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.