



The University of Southern Queensland

Course Specification

Description: Remote Sensing and Meteorology

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
PHY	1102	24407	2, 2003	ONC	1.00	TWMBBA

Academic Group:	FOSCI
Academic Org:	FOS002
HECS 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 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.

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 and the hydrological cycle.

OBJECTIVES

On completion of this course students will be able to:

- apply basic principles of physics to the areas of remote sensing and meteorology;
- perform experiments which demonstrate and reinforce aspects of the theory using the appropriate equipment safely;
- effectively communicate their knowledge of Environmental Physics.

TOPICS

Description	Weighting (%)
1. Electromagnetic radiation Maxwell's equations, electromagnetic spectrum, energy levels, image characteristics, energy interactions in the atmosphere.	15.00
2. Data acquisition - Sensors, Landsat, SPOT, NOAA satellites, multispectral and thermal scanning.	11.00
3. Image processing - Image structure, image processing systems, image restoration, image enhancement, information extraction/ classification.	12.00
4. Applications - resource exploration, environmental and land use applications, meteorological applications, natural hazards and radar remote sensing.	14.00
5. Measurement and Uncertainty, Weather Forecasting and Observation.	8.00
6. Atmospheric Dynamics, structure and composition.	8.00
7. Atmospheric Radiation - energy budget, Greenhouse effect and global warming.	16.00
8. Sub-synoptic scale - thunderstorms, tropical cyclones and micro-meteorology.	16.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED:

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at <http://bookshop.usq.edu.au> by entering the author or title of the text.

Laboratory and Tutorial Manual for Remote Sensing and Meteorology, University of Southern Queensland, Toowoomba.

Mason, N. and Hughes, P 2001, *Introduction to Environmental Physics*, Taylor and Francis, London.

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.

IEEE Transactions on GeoScience and Remote Sensing (550 P10).

J of the Atmospheric Sciences, American Met Society (551.5 P10).

J of Photogrammetric Engineering and Remote Sensing, (526.982 P2).

Weather, Royal Met Society, (551.6 P1).

Colls, K. & Whitaker, R 1993, *The Australian Weather Book*, National, Brookvale, NSW.

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, R 1999, *Computer Processing of Remotely Sensed Images*, 2nd edition, John Wiley, New York.

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

Rogers, R.R. & Yau, M.K 1989, *A Short Course in Cloud Physics*, 3rd edition, Pergamon Press, Oxford.

Sturman, A.P. & Tapper, N.J 1996, *The Weather and Climate of Australia and New Zealand*, Oxford University Press, Melbourne.

Tapper, N. & Hurry, L 1993, *Australia's Weather Patterns, An Introductory Guide*, Dellasta Pty Ltd, Mount Waverly.

WMO 1983, *Guide to Meteorological Instruments and Methods of Observation*, 5th edition, WMO No. 8 (551.5 GUI and Physics Lab), Geneva.

WMO 1987, *International Cloud Atlas*, WMO (551.576 WOR). Geneva, Vol 2.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	3
Laboratory or Practical Classes	12
Lectures	24
Private Study	111
Report Writing	20

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
LABORATORY REPORTS	100.00	30.00	Y	22 Jul 2003 (see note)
REMOTE SENSING MODULES	100.00	10.00	Y	22 Jul 2003 (see note)
3 HOUR CLOSED EXAM	100.00	60.00	Y	END S2 (see note)

NOTES:

- . Examiner to advise due date for Laboratory reports.
- . Examiner to advise dates of Remote Sensing Modules.
- . 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 sheets 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 10% 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 Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination.
- 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/SECARIAT/calendar/Part5/> or in the printed version of the current USQ Handbook.

ASSESSMENT NOTES

- 9 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This shall include a laboratory coat, closed in shoes, and safety glasses. Such equipment must be approved by supervising staff. Failure to provide and wear the appropriate safety equipment will result in students being excluded from classes.
- 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. In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.