



The University of Southern Queensland

Course Specification

Description: Remote Sensing and Meteorology

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
PHY	1102	14406	2, 2002	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. REMOTE SENSING SECTION - 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, radar imagery.	13.00
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. METEOROLOGY SECTION	10.00
5. Measurement and Uncertainty, Weather Forecasting and Observation	8.00
6. Atmospheric Dynamics, Scale, structure and composition (including ozone)	8.00
7. Atmospheric Radiation - UVI, energy budget, Greenhouse effect and Solar/climate connection	16.00
8. Hydrological Cycle - clouds, rainfall, soil moisture, thunderstorms, tropical cyclones.	18.00

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, USQ Publication, 65014/PHY1102 *Remote Sensing & Meteorology, Introductory/Study Book*, USQ, 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).

Monthly Weather Review, American Met Society (551.5 PQ).

Monthly Weather Review, Queensland (551.69943 P1).

Weather, Royal Met Society, (551.6 P1).

- Colls, K. & Whitaker, R. 1993, *The Australian Weather Book*, National, Brookvale.
- Crowder, B. 2000, *The Wonders of the Weather*, Bureau of Meteorology, Melbourne.
- Gells, R. 1994, *Rob Gell's, Environment - The Weather*, Box Hill College of Tafe, Box Hill.
- 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	20
Private Study	103
Report Writing	20
Tutorial	24

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
LABORATORY REPORTS	100.00	30.00	Y	22 Jul 2002 (see note 1)
TUTORIAL MODULES	100.00	10.00	Y	22 Jul 2002 (see note 2)
3 HOUR CLOSED EXAM	100.00	60.00	Y	END S2 (see note 3)

NOTES:

1. Examiner will advise due dates of reports early in Semester.
2. Examiner will advise due dates of tutorial modules early in Semester

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

OTHER REQUIREMENTS

- 1 Attendance Requirements It is the students' responsibility to participate actively in all classes 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. Students must attend at least 80% of the practical classes in this course to satisfy the practical requirements of Objective 3.
- 2 Requirements to Complete Satisfactorily Each Assessment Item To complete satisfactorily the tutorial modules students must obtain at least half of the marks available for them. To complete satisfactorily the examination, students must obtain at least half of the marks available for the examination. To complete satisfactorily the practical component of the course, students must submit all the nominated practical reports and obtain at least half of the marks available for each report submitted. It is unlikely that students will be able to achieve this unless they attend at least 80% of the practical classes.
- 3 Minimum Requirements to Pass the Course To be assured of a pass in this course, students must satisfactorily complete each assessment item.
- 4 Grading Final grades for students will be determined by the addition of the marks obtained in each assessment item, weighted as in the Assessment Details.
- 5 Supplementary and Deferred Examinations 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. Any supplementary or deferred examination for this course will be held during the examination period at the end of the semester of the next offering of this course.
- 6 Assignments The due date for an assignment is the date by which a student must despatch it to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner. All laboratory reports are due at the beginning of the next practical session to which the student has been assigned. A 10% penalty will apply up to 5pm of the due date. Students must retain a copy of each item submitted for assessment. This must be produced within 48 hours if required by the Examiner. In accordance with the University's Policy on Assignments (Regulation 5.6.1), the Examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances. This policy may be found in the USQ Handbook, the Distance Education Student Guide and the Faculty of Sciences' Orientation Handbook for new on-campus students. All students are advised to study and follow the guidelines associated with this policy. An assignment submitted after the due date without an extension approved by the Examiner, will attract a penalty of 20% of the assigned mark for each day (or part thereof) that the assignment is late.
- 7 Examinations Candidates should be aware that the University has policies and regulations (Regulation 5.6.2.2) about the use of unfair means and electronic devices in an examination and they should refer to them to determine whether or not actions

they intend to take are acceptable to the University. Closed Examination: Candidates are allowed to bring only writing and drawing instruments into the closed examination.
