The University of Southern Queensland

Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.
Please consult the web for updates that may occur during the year.

Description: Remote Sensing and Image Processing

Subject	Cat-nbr	Term	Mode	Units	Campus
GIS	3406	2, 2010	EXT	1	Toowoomba

Academic group: FOENS
Academic org: FOES05
Student contribution band: 2
ASCED code: 031103

STAFFING

Examiner: Kithsiri Perera
Moderator: Armando Apan

RATIONALE

Remote sensing is an important technology for land resource mapping, monitoring and modelling. Remotely sensed images provide an invaluable source of current and archival information about the geographical distribution of natural and man-made features. The use of digital images in various applications is aiding planners and decision-makers at various project stages and operational scales. It is essential and advantageous for GIS, surveying, and other professionals to be familiar with the concepts, techniques, and applications, involved in the digital processing of remotely sensed images.

SYNOPSIS

This course is designed to provide students with the basic and intermediate knowledge and skills in the digital processing of remotely sensed images. Topics include: basic principles of remote sensing; image processing systems; pre-processing of remotely-sensed data; image enhancement techniques; image transformation and filtering techniques; unsupervised classification; supervised classification; post classification and accuracy assessment; integration with GIS; and applications and case studies. Various imagery products will be studied, such as panchromatic, multispectral and hyperspectral data. Image processing software will be used to demonstrate and reinforce the concepts and principles involved.

OBJECTIVES

The course objectives define the student learning outcomes for a course. On completion of this course, students should be able to:

1. evaluate the importance and role of remote sensing and digital image processing in land resource mapping, monitoring and modelling;
2. demonstrate knowledge of the concepts and techniques involved in digital image processing of remotely sensed data;
3. choose and apply appropriate image processing technique(s) for a specific requirement;

4. evaluate the accuracy of image classification output;
5. compare with the traditional and recent applications of image processing techniques;
6. use image processing software to analyse temporal, spectral and spatial differences.

TOPICS

	Description	Weighting (%)
1.	Basic principles of remote sensing	10.00
2.	Remote sensing platforms and sensors	10.00
3.	Image processing systems	8.00
4.	Pre-processing of remotely sensed data	12.00
5.	Image enhancement, transformation and filtering techniques	20.00
6.	Image classification	20.00
7.	Advanced topics	10.00
8.	Integration with GIS	10.00

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).

Mather, PM2004, *Computer Processing of Remotely-Sensed Images: An Introduction*, 3rd edn, John Wiley and Sons Ltd, West Sussex, England.
(ISBN: 0-470-84919-3)

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.

Campbell, J2007, *Introduction to Remote Sensing*, 4th edn, Taylor & Francis, London.

Jensen, JR2007, *Remote Sensing of the Environment An Earth Resource Perspective*, 2nd edn, Pearson Prentice Hall, Upper Saddle River, New Jersey.

Lillesand, TT2004, *Remote Sensing and Image Interpretation*, 5th edn, Wiley, New York.

Richards, JA2005, *Remote Sensing Digital Image Analysis: an introduction*, 4th edn, Springer, Berlin.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	51.00
Directed Study	52.00
Examinations	2.00
Private Study	50.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date	Objectives assessed	Graduate skill	Level assessed
ASSIGNMENT 1	200	20	01 Sep 2010	1, 2, 3, 6		
ASSIGNMENT 2	200	20	13 Oct 2010	All		
2 HOUR CLOSED EXAMINATION	600	60	END S2 (see note 1)	All		

NOTES

1. Student Administration will advise students of the dates of their examinations during the semester.

IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility 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 individual assessment item a student must achieve at least 50% of the marks or a grade of at least C-

3 Penalties for late submission of required work:
If students submit assignments after the due date without extenuating circumstances then a penalty of 5% of the assigned mark may apply for each working day late up to a maximum of ten working days at which time a mark of zero can be recorded for that assignment.

4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade in a course a student must obtain at least 50% of the total weighted marks for the course.

5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the aggregate of the weighted marks /grades obtained for each of the summative assessment items in the course.

6 Examination information:
Candidates are allowed to bring only writing and drawing instruments into the Closed 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 Student Policies:
Students should read the USQ policies Definitions, Assessment and Student Academic Misconduct to avoid actions which might contravene University policies and practices. These polices can be found at the URL
http://policy.usq.edu.au/portal/custom/search/category/usq_document_policy_type/Student.1.html.

ASSESSMENT NOTES

1 The due date for an assignment is the date by which a student must despatch the assignment to USQ. The onus is on the student to provide proof of the dispatch date, if requested by the Examiner.

2 Students may be required to provide a copy of assignments submitted for assessment purposes. Such copies should be dispatched to the USQ within 24 hours of receipt of a request to do so.

3 In accordance with University Policy, the Examiner may grant an extension of the due date of an assignment in extenuating circumstances.

4 The usual method of assessment submission for the Faculty is by written, typed or printed paper-based media (i) submitted to the Faculty Office for students enrolled in the course in the on-campus mode, or (ii) mailed to the USQ for students enrolled in the course in the external mode. The due date for the assessment is the date by which a student must (i) submit the assessment for students enrolled in the on-campus mode, or (ii) mail the assessment for students enrolled in the external mode.

5 The Faculty will NOT normally accept submission of assessments by facsimile or email.

6 If electronic submission of assessments is specified for the course, students will be notified of this in the course Introductory Book and on the USQ Study Desk. All required electronic submission must be made through the Assignment Drop Box located on the USQ Study Desk for the course, unless directed otherwise by the examiner of the course. The due date for an electronically submitted assessment is the date by which a student must electronically submit the assignment.

7 Students who do not have regular access to postal services for the submission of paper-based assessments, or regular access to Internet services for electronic submission, or are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements prior to the submission date.

8 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non-directed personal study.

9 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

10 Harvard (AGPS) is the referencing system required in this course. Students should use Harvard (AGPS) style in their assignments to format details of the information sources

they have cited in their work. The Harvard (AGPS) style to be used is defined by the USQ Library's referencing guide. http://www.usq.edu.au/library/help/referencing/default.htm

EVALUATION AND BENCHMARKING

In meeting the University's aims to establish quality learning and teaching for all programs, this course monitors and ensures quality assurance and improvements in at least two ways. This course: 1. conforms to the USQ Policy on Evaluation of Teaching, Courses and Programs to ensure ongoing monitoring and systematic improvement. 2. forms part of the Bachelor of Spatial Science and is benchmarked against the internal USQ accreditation/reaccreditation processes which include (i) stringent standards in the independent accreditation of its academic programs, (ii) close integration between business and academic planning, and (iii) regular and rigorous review; and professional accreditation standards of the Surveyors Board of Queensland.