Description: Remote Sensing and Image Processing

Subject | Cat-nbr | Class | Term | Mode | Units | Campus
---|---|---|---|---|---|---
GIS | 3406 | 4526 | 2, 2005 | ONC | 1.00 | Toowoomba

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

STAFFING
Examiner: Armando Apan
Moderator: Frank Young

REQUISITES
Pre-requisite: SVY3202

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. Image processing software will be used to demonstrate and reinforce the concepts and principles involved.

OBJECTIVES
On completion of this course students will 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**

<table>
<thead>
<tr>
<th>Description</th>
<th>Weighting (%)</th>
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<tbody>
<tr>
<td>Basic principles of remote sensing</td>
<td>10.00</td>
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<tr>
<td>Remote sensing platforms and sensors</td>
<td>10.00</td>
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<tr>
<td>Image processing systems</td>
<td>8.00</td>
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<tr>
<td>Pre-processing of remotely sensed data</td>
<td>12.00</td>
</tr>
<tr>
<td>Image enhancement, transformation and filtering techniques</td>
<td>20.00</td>
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<tr>
<td>Image classification</td>
<td>20.00</td>
</tr>
<tr>
<td>Advanced topics</td>
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</tr>
<tr>
<td>Integration with GIS</td>
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</tbody>
</table>

**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).


**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>Assessment</td>
<td>40.00</td>
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<tr>
<td>Examinations</td>
<td>3.00</td>
</tr>
<tr>
<td>Lectures</td>
<td>26.00</td>
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<tr>
<td>Private Study</td>
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<td>Tutorials</td>
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ASSESSMENT DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks out of</th>
<th>Wtg(%)</th>
<th>Due date</th>
</tr>
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<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>200.00</td>
<td>20.00</td>
<td>29 Aug 2005</td>
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<tr>
<td>ASSIGNMENT 2</td>
<td>200.00</td>
<td>20.00</td>
<td>10 Oct 2005</td>
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<td>3 HOUR CLOSED EXAMINATION</td>
<td>600.00</td>
<td>60.00</td>
<td>END S2</td>
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</table>

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 complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assignment. To complete the examination satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for the examination.

3 Penalties for late submission of required work:
   If students submit assessments after the due date without prior approval then a penalty of 20% 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 submit all of the summative assessment items, achieve at least 45% 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 grade for students will be assigned on the basis of the weighted aggregate of the marks (or grades) 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 the online USQ Handbook.

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 must retain a copy of each item submitted for assessment. This must be
despatched to USQ within 24 hours if required by the Examiner.

3 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.

4 The Faculty will normally only accept assessments that have been written, typed or
printed on paper-based media.

5 The Faculty will NOT accept submission of assignments by facsimile.

6 Students who do not have regular access to postal services or who are otherwise
disadvantaged by these regulations may be given special consideration. They should
contact the Examiner of the course to negotiate such special arrangements.

7 In the event that a due date for an assignment falls on a local public holiday in their
area, such as a Show holiday, the due date for the assignment will be the next day.
Students are to note on the assignment cover, the date of the public holiday for the
Examiner's convenience.

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 one of the temporary grades. IM (Incomplete - Make up), IS
(Incomplete - supplementary examination) or ISM (Incomplete - supplementary
examination and make-up). A temporary 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. The following temporary grade may be awarded: IDM
(Incomplete Deferred Make-up).