



The University of Southern Queensland

## Course Specification

### Description: Spatial Analysis and Modelling

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
GIS	3405	24660	2, 2003	EXT	1.00	TWMB

<b>Academic Group:</b>	FOENS
<b>Academic Org:</b>	FOES05
<b>HECS Band:</b>	2
<b>ASCED Code:</b>	031199

### STAFFING

Examiner: Yan Liu

Moderator: Armando Apan

### PRE-REQUISITES

Pre-requisite: GIS1402

### OTHER-REQUISITES

Prerequisites E4023

### RATIONALE

The strength of most geographic and land information systems (GIS/LIS) depends on their capability to perform spatial analysis and modelling. Considered as the "heart" of GIS, spatial analysis and modelling makes GIS a powerful technology for land, environmental, and resource management. Thus, it is essential and advantageous for GIS and other professionals to be aware of the concepts, techniques, and applications involved in spatial analysis and modelling.

### SYNOPSIS

Students will be introduced to the concepts, techniques, and applications of spatial analysis and modelling. Topics include: spatial statistics; overlay analysis; map algebra and cartographic modelling; spatial interpolation; surface analysis and terrain modelling; proximity analysis; network analysis; fuzzy sets; and spatial analysis issues and trends. Emphasis will be placed on how spatial analysis and modelling is used in practical applications, and as a functional component of a modern GIS/LIS. GIS software will be used to demonstrate and reinforce the various analytical and modelling concepts.

## OBJECTIVES

On completion of this course, students should be able to:

- recognise the importance of spatial analysis and modelling for GIS/LIS applications;
- define the concepts and techniques involved in spatial analysis and modelling;
- choose and apply appropriate analytical operations and techniques needed for a particular GIS/LIS applications;
- make appropriate use of a GIS software supporting spatial analysis and modelling functions;
- critically evaluate the relevance and validity of results from a specific spatial analysis and modelling task.

## TOPICS

Description	Weighting (%)
1. Overview of GIS/LIS and spatial analysis and modelling	5.00
2. The types and characteristics of analytical operations and modelling in GIS	10.00
3. Spatial pattern and arrangement of point, line, and polygon features	10.00
4. Spatial statistics	10.00
5. Overlay analysis, map algebra and cartographic modelling	10.00
6. Spatial interpolation, surface analysis and terrain modelling	10.00
7. Distance relationships and proximity analysis	10.00
8. Network analysis: routing, districting and cost and allocation functions	10.00
9. Fuzzy sets and fuzzy geographical objects	10.00
10. Issues and trends in spatial data analysis and modelling	5.00
11. Applications and case studies	10.00

## 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.

Access to TNTLite software is required for this course. The software is available from the USQ Bookshop on CD.

## 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.

Burrough, P. A. & McDonnell, R. A. 1998, *Principles of Geographical Information Systems*, Oxford University Press,

Chrisman, N. 2002, *Exploring Geographic Information Systems*, 2nd edition, Wiley,  
 DeMers, M. 1997, *Fundamentals of Geographic Information Systems*, Wiley,  
 DeMers, M. 2002, *GIS Modeling in Raster*, Wiley,

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	50
Directed Study	52
Examinations	3
Private Study	50

## ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
ASSIGNMENT 1	200.00	20.00	Y	08 Sep 2003
ASSIGNMENT 2	200.00	20.00	Y	20 Oct 2003
3 HOUR CLOSED EXAMINATION	600.00	60.00	Y	END S2 (see note )

### NOTES:

- . 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 assessment items satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assessment item.
- 3 Penalties for late submission of required work:  
If students submit assignments 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 achieve at least 45% in each of the summative assessments 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 (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 in the printed version of the current USQ Handbook.

## **ASSESSMENT NOTES**

- 1 The due date for an assignment 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.
- 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 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).