



The University of Southern Queensland

## Course specification

This version produced 20 Dec 2007.

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: Spatial Analysis and Modelling

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
GIS	3405	66441	2, 2007	EXT	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES05
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	031199

### STAFFING

Examiner: Armando Apan

Moderator: Badri Basnet

### OTHER REQUISITES

Recommended prior or concurrent study: GIS1402

### RATIONALE

The strength of most geographic information systems (GIS) 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 spatial information 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 a functional component of a modern spatial information system.

### OBJECTIVES

The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. recognise the importance of spatial analysis and modelling for GIS applications. (Assignment 1; Assignment 2 and Exam);
2. define the concepts and techniques involved in spatial analysis and modelling. (Assignment 1; Assignment 2 and Exam);

3. choose and apply appropriate analytical operations and techniques needed for a particular GIS applications. (Assignment 1; Assignment 2 and Exam);
4. critically evaluate the relevance and validity of results from a specific spatial analysis and modelling task. (Assignment 1; Assignment 2 and Exam).

## TOPICS

	Description	Weighting (%)
1.	Overview of GIS 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 analysis and modelling	5.00
11.	Applications and case studies	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).

GIS3405 Spatial Analysis and Modelling, external study package, USQ Publication

## 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 and McDonnell, R A 1998, *Principles of Geographical Information Systems*, Oxford University Press, Oxford.

Chrisman, N 2002, *Exploring Geographic Information Systems*, 2nd edn, Wiley, New York.

DeMers, M 2005, *Fundamentals of Geographic Information Systems*, 3rd edn, Wiley, New York.

DeMers, M 2002, *GIS Modeling in Raster*, Wiley, New York.

## STUDENT WORKLOAD REQUIREMENTS

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

## ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
SPATIAL ANALYSIS & MODELLING 1	200.00	20.00	03 Sep 2007
SPATIAL ANALYSIS & MODELLING 2	200.00	20.00	19 Oct 2007
2 HOUR CLOSED EXAMINATION	600.00	60.00	END S2 (see note 1)

### NOTES

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

## 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 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 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 40% in each of the weighted assessment items, achieve at least 50% in the examination and at least 50% of the total weighted marks available 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 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/corporateservices/calendar/part5.htm> or in 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 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 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, 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).