School of Environmental and Life Sciences

GEOS6250: Advanced Spatial Science

Online

Trimester 2 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

Geographic Information Systems (GIS) has widespread applications in studies of the environment, the physical landscape and in urban and regional planning. It has a variety of commercial, social and environmental applications. GEOS6250 covers the advanced components of GIS and their uses. The use of GIS as a problem-solving tool is studied as well as the development of GIS competencies through computer laboratory based practicals. The successful completion of a major problem solving exercise involving the collection and processing of integrated socio-economic, environmental and/or physical data is a major component of this course.

Academic Progress Requirements

Nil

Requisites

Students must have successfully completed GEOS2161 or SURV2650 or SURV3650 or GEOS6161 or GEOS6350 to enrol in this course.

Contact Hours

Online
Computer Lab
Online
2 hour(s) per week(s) for 12 week(s) starting Week 1

Lecture
Online
2 hour(s) per week(s) for 12 week(s) starting Week 1

Unit Weighting Workload

10
Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Online
A/Pr Hannah Power
Hannah.Power@newcastle.edu.au
(02) 4921 5606
Consultation: By appointment. Please send an email.

Teaching Staff

Other teaching staff will be advised on the course Canvas site.

School Office

School of Environmental and Life Sciences
Room C228 Chemistry Building
Callaghan
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+61 2 4921 5080
9am-5pm (Mon-Fri)

SYLLABUS

Course Content

1. The history of GIS modelling in the social and physical sciences
2. The uses of GIS as a descriptive, analytical and modelling tool
3. Key competencies in commonly available GIS software
4. Data collection and assembly
5. Problem solving using GIS

Course Learning Outcomes

On successful completion of this course, students will be able to:
1. Assess the nature of spatial data collection, assembly, and management, and compare and contrast different approaches;

2. Demonstrate advanced use of GIS software commonly used in government, business and other domains;

3. Evaluate and compare the major debates, conceptual approaches and theories regarding applications of GIS modelling in spatial analysis;

4. Undertake integrated problem solving exercises using commonly available GIS software and on-line data sources;

5. Design, develop, undertake, and critique a GIS based research project;

6. Communicate effectively in both oral and written forms.

Course Materials

Other Resources:
- All course materials will be provided via Canvas.

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	13 May	GIS basics, Introduction to ArcGIS Pro, and Making Maps	Online Learning Modules Lab 1: Introduction to ArcGIS	
2	20 May	Spatial interpolation, Working with Tabular Data, and Raster Calculator	Online Learning Modules Lab 2: Newcastle and SLR Stage 1	OLM Quiz
3	27 May	Multispectral Data, Introduction to ModelBuilder	Online Learning Modules Lab 3: Newcastle and SLR Stage 2	OLM Quiz
4	3 Jun	Using Instruments, Numerical Classification and Reclassification	Online Learning Modules Lab 4: Newcastle and SLR Stages 3 & 4	OLM Quiz
5	10 Jun	Scientific Writing Skills	Online Learning Modules Lab 5: Project 1	OLM Quiz
6	17 Jun	Finding Data and Data Sources	Lab 6: Project 1	Take home Practical Assessment
7	24 Jun	GIS in Research	Online Learning Modules Lab 7: Project 2	OLM Quiz
8	1 Jul	GIS in Research	Lab 8: Project 2	Project 1 Practical Report
9	8 Jul	Introduction to Coding	Online Learning Modules Lab 9: Project 2	Project 2 Proposal Presentation
10	15 Jul	GIS Applications	Lab 10: Project 2	OLM Quiz
11	22 Jul	GIS Applications	Lab 11: Project 2	
12	29 Jul	GIS Applications	Lab 12: Project 2	Project 2 Individual Report
Exams				

ASSESSMENTS

This course has 5 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Practical assessment	4pm Friday 21st June	Individual	25%	1, 2, 4, 6
2	Quizzes	4pm Friday Weeks 2, 3, 4, 5, 7, 10	Individual	10%	1, 2, 3, 4, 6
3	Presentation	Lab 9: Wednesday 10th July	Individual	15%	1, 3, 6
4	Practical report	4pm Monday 1st July	Individual	25%	1, 2, 3, 6
5	Individual project report	4pm Friday 2nd August	Individual	25%	1, 2, 3, 4, 5, 6

Late Submissions

The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Practical assessment

Assessment Type	Practical Demonstration
Description	You will use GIS software and novel datasets to solve scientific questions using the GIS techniques you have learnt during the course.
Weighting	25%
Due Date	4pm Friday 21st June
Submission Method	Take home assessment submitted online
Assessment Criteria	This assessment covers Course Learning Outcomes 1, 2, 4, and 6. Instructions/marking rubrics are available on Canvas.
Return Method	
Feedback Provided	Feedback will be provided via Canvas within 15 working days of submission.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 2 - Quizzes

Assessment Type	Quiz
Description	Online quizzes on Online Learning Modules.
Weighting	10%
Due Date	Due 4pm Friday in the weeks outlined in the schedule.
Submission Method	Online. This assessment is conducted via Quizzes on Canvas.
Assessment Criteria	This assessment covers Course Learning Outcomes 1, 2, 3, 4, and 6. Instructions/marking rubrics are available on Canvas.
Return Method	Online
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 3 - Presentation

Assessment Type	Presentation
Description	Presentation on your independent research project focusing on the scientific question you are planning to address and the methods you will use to achieve the aims.
Weighting	15%
Due Date	During the lab session on Wednesday 10th July
Length	12 minutes
Submission Method	Presentations will be delivered online and a PDF of the PowerPoint will be submitted through Canvas.
Assessment Criteria	This assessment covers Course Learning Outcomes 1, 3, and 6. Instructions/marking rubrics are available on Canvas.
Return Method	Online
Feedback Provided	Online – during the presentation session.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 4 - Practical report

Assessment Type	Report
Description	This assessment will evaluate your ability to complete a project based on the skills you learnt in Labs 2-5 and assess your ability to communicate the results of your lab work in a scientific report.
Weighting	25%
Due Date	4pm Monday 1st July
Submission Method	Online Report must be submitted to the TurnItIn assessment portal on Canvas.
Assessment Criteria	This assessment covers Course Learning Outcomes 1, 2, 3, and 6. Instructions/marking rubrics are available on Canvas.
Return Method	Online
Feedback Provided	Online - Feedback will be provided via Canvas within 15 working days of submission.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 5 - Individual project report

Assessment Type	Project
Description	Written report detailing the results of the GIS Independent Research Project undertaken during Labs 7-12.
Weighting	25%
Due Date	4pm Friday 2nd August
Submission Method	Online Report must be submitted to the TurnItIn assessment portal on Canvas.
Assessment Criteria	This assessment covers Course Learning Outcomes 1, 2, 3, 4, 5, and 6. Instructions/marking rubrics are available on Canvas.
Return Method	Online
Feedback Provided	Online - Feedback will be provided via Canvas within 15 working days of submission.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure.

	In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.
Academic Misconduct	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.
Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where: 1. the assessment item is a major assessment item; or 2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system; 3. you are requesting a change of placement; or 4. the course has a compulsory attendance requirement. Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: https://policies.newcastle.edu.au/document/view-current.php?id=236
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.