

## GEOS3250: Advanced Spatial Science

Callaghan and Ourimbah  
Semester 1 - 2024



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

## 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. GEOS3250 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** To enrol in this course students must have successfully completed GEOS2161 or SURV2650 or SURV3650.

**Contact Hours**

**Computer Lab**  
Face to Face On Campus  
2 hour(s) per week(s) for 13 week(s) starting Week 1

**Lecture**  
2 hour(s) per week(s) for 13 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.

# COURSE OUTLINE

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# CONTACTS

<b>Course Coordinator</b>	<b>Callaghan and Ourimbah</b> Dr Kendall Mollison <a href="mailto:Kendall.Mollison@newcastle.edu.au">Kendall.Mollison@newcastle.edu.au</a> Consultation: Please email to arrange a consultation time.
<b>Teaching Staff</b>	Other teaching staff will be advised on the course Canvas site.
<b>School Office</b>	<b>School of Environmental and Life Sciences</b> Room C228 Chemistry Building Callaghan <a href="mailto:Science-SELS@newcastle.edu.au">Science-SELS@newcastle.edu.au</a> +61 2 4921 5080 9am-5pm (Mon-Fri)
	<b>School of Environmental and Life Sciences</b> SO-104 / SO-105 Science Offices OURIMBAH <a href="mailto:Science-SELS@newcastle.edu.au">Science-SELS@newcastle.edu.au</a> 4349 4568 / 4348 4115 9am-5pm (Mon-Fri)

# SYLLABUS

<b>Course Content</b>	<ol style="list-style-type: none"><li>1. The history of GIS modelling in the social and physical sciences</li><li>2. The uses of GIS as a descriptive, analytical and modelling tool</li><li>3. Key competencies in commonly available GIS software</li><li>4. Data collection and assembly</li><li>5. Problem solving using GIS</li></ol>
<b>Course Learning Outcomes</b>	<b>On successful completion of this course, students will be able to:</b> <ol style="list-style-type: none"><li>1. Describe the nature of spatial data collection, assembly, and management;</li><li>2. Demonstrate proficient operation of GIS software commonly used in government, business and other domains;</li><li>3. Describe and contrast the major debates, conceptual approaches and theories regarding applications of GIS modelling in spatial analysis;</li><li>4. Undertake integrated problem solving exercises using commonly available GIS software and on-line data sources;</li><li>5. Work effectively as a team;</li><li>6. Communicate effectively in both oral and written forms.</li></ol>
<b>Course Materials</b>	<b>Other Resources:</b> <ul style="list-style-type: none"><li>- All course materials and announcements will be provided via the Canvas site.</li></ul>

# SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	26 Feb	Lecture 1: GIS revision and introduction to ArcPro	Lab1: Introduction to ArcPro	
2	4 Mar	Lecture 2: SLR, inundation mapping, and introduction to the SLR lab project	Lab 2: Newcastle and SLR project - Stage 1	
3	11 Mar	Lecture 3: Scientific writing skills	Lab 3: Newcastle and SLR project - Stage 2	
4	18 Mar	Lecture 4: GIS applications	Lab 4: Newcastle and SLR project - Stage 3 (Self-guided fieldtrip)	
5	25 Mar	Lecture 5: GIS applications	Lab 5: Newcastle and SLR project - Stage 4 Practice Practical Quiz	
6	1 Apr	No Lecture (due to Easter Monday)	No Lab (due to UON closedown)	Project 1 report: Newcastle and SLR
7	8 Apr	Lecture 6: Project 2 introduction and outline	Lab 6: Practical Quiz	Practical Quiz
<b>Mid-Semester Recess</b>				
<b>Mid-Semester Recess</b>				
8	29 Apr	Student Poster Session	Lab 7: Project 2	Poster presentation
9	6 May	Student Poster Session	Lab 8: Project 2	
10	13 May	Lecture 7: Project 2 update and GIS applications	Lab 9: Project 2	
11	20 May	Lecture 8: GIS applications	Lab 10: Project 2	
12	27 May	Lecture 9: GIS applications	Lab 11: Project 2	
13	3 Jun	No Lecture	Lab 12: Project 2	Project 2 report
<b>Examination Period</b>				
<b>Examination Period</b>				

# 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	During your scheduled lab in Week 7	Individual	25%	1, 2, 4, 6
2	Quizzes	Friday 5pm of the week of the guest lecture (announced in class and via Canvas announcements).	Individual	10%	1, 2, 3, 4, 6
3	Group presentation and poster	Monday 29th April at 8 am (during lecture timeslot) Groups will either present their poster during the Week 8 or Week 9 lecture timeslot, but all poster files are due at the same time.	Group	15%	1, 3, 5, 6
4	Practical report	Friday 5th April at 5pm (Week 6)	Individual	25%	1, 2, 3, 4, 6
5	Individual project report	Friday 7th June at 5 pm (Week 13)	Individual	25%	1, 2, 3, 4, 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.

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## Assessment 1 - Practical assessment

<b>Assessment Type</b>	Practical Demonstration
<b>Purpose</b>	This assessment will evaluate your ability to use GIS software to solve problems.
<b>Description</b>	You will use GIS software and novel datasets to solve scientific questions using the GIS techniques you have learnt during the course.
<b>Weighting</b>	25%
<b>Due Date</b>	During your scheduled lab in Week 7
<b>Submission Method</b>	In Class Online
<b>Assessment Criteria</b>	This assessment is an in-class assessment with responses submitted via Canvas. This assessment covers Course Learning Outcomes 1, 2, 4, and 6. Instructions/marketing rubrics are available on Canvas.
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Online - Feedback will be provided via Canvas within 15 working days of submission.
<b>Opportunity to Reattempt</b>	Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 2 - Quizzes

<b>Assessment Type</b>	Quiz
<b>Purpose</b>	This assessment will evaluate your understanding of how GIS is used across a wide range of applications as presented to you in the guest lectures (GIS applications lectures).
<b>Description</b>	Reports on guest lectures (GIS applications) conducted via online quizzes on Canvas.
<b>Weighting</b>	10%
<b>Due Date</b>	Friday 5pm of the week of the guest lecture (announced in class and via Canvas announcements).
<b>Submission Method</b>	Online
<b>Assessment Criteria</b>	This assessment is conducted via Quizzes on Canvas. This assessment covers Course Learning Outcomes 1, 2, 3, 4, and 6. Instructions/marketing rubrics are available on Canvas.
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Online - Feedback will be provided via Canvas within 15 working days of submission.
<b>Opportunity to Reattempt</b>	Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 3 - Group presentation and poster

<b>Assessment Type</b>	Presentation
<b>Purpose</b>	This assessment will evaluate your ability to work in a group to create a poster on one aspect of GIS and present your poster to the class.
<b>Description</b>	Presentation and poster on a topic related to GIS.
<b>Weighting</b>	15%
<b>Due Date</b>	Monday 29th April at 8 am (during lecture timeslot) Groups will either present their poster during the Week 8 or Week 9 lecture timeslot, but all poster files are due at the same time.
<b>Submission Method</b>	In Class In class presentation
<b>Assessment Criteria</b>	This assessment covers Course Learning Outcomes 1, 3, 5, and 6. Instructions/marketing rubrics are available on Canvas.
<b>Return Method</b>	In Class
<b>Feedback Provided</b>	In Class - Feedback will be provided in person during the poster session.
<b>Opportunity to Reattempt</b>	Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 4 - Practical report

<b>Assessment Type</b>	Report
<b>Purpose</b>	This assessment will evaluate the work you complete in Labs 2-5 and assess your ability to communicate the results of your lab work in a scientific report.
<b>Description</b>	Written report detailing the results of the Newcastle Sea Level Rise (SLR) and Inundation Mapping Project undertaken during Labs 2-5.
<b>Weighting</b>	25%

<b>Due Date</b>	Friday 5th April at 5pm (Week 6)
<b>Submission Method</b>	Online Reports must be submitted to TurnItIn on Canvas.
<b>Assessment Criteria</b>	This assessment covers Course Learning Outcomes 1-4, and 6. Instructions/marketing rubrics will be available on Canvas.
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Online - Feedback will be provided within 15 working days of submission.
<b>Opportunity to Reattempt</b>	Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 5 - Individual project report

<b>Assessment Type</b>	Project
<b>Purpose</b>	This assessment will evaluate the work you complete in Labs 7-12. It will assess your ability to identify a scientific question, develop an appropriate GIS-based method, obtain results, and communicate the results of your work in a scientific report.
<b>Description</b>	Written report detailing the results of the GIS Independent Research Project undertaken during Labs 7-12.
<b>Weighting</b>	25%
<b>Due Date</b>	Friday 7th June at 5 pm (Week 13)
<b>Submission Method</b>	Online Reports must be submitted to TurnItIn on Canvas.
<b>Assessment Criteria</b>	This assessment covers Course Learning Outcomes 1-4, and 6. Instructions/marketing rubrics will be available on Canvas.
<b>Return Method</b>	In Person
<b>Feedback Provided</b>	Online - Feedback will be provided via Canvas within 15 working days of submission.
<b>Opportunity to Reattempt</b>	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).

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<b>Communication Methods</b>	Communication methods used in this course include: <ul style="list-style-type: none"><li>- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.</li><li>- Email: Students will receive communications via their student email account.</li><li>- Face to Face: Communication will be provided via face to face meetings or supervision.</li></ul>
<b>Course Evaluation</b>	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.
<b>Oral Interviews (Vivas)</b>	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 <a href="#">Oral Examination (viva) Procedure</a> . 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 <a href="#">Student Conduct Rule</a> .
<b>Academic Misconduct</b>	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 <a href="https://policies.newcastle.edu.au/document/view-current.php?id=35">https://policies.newcastle.edu.au/document/view-current.php?id=35</a> .
<b>Adverse Circumstances</b>	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: <ol style="list-style-type: none"><li>1. the assessment item is a major assessment item; or</li><li>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;</li><li>3. you are requesting a change of placement; or</li><li>4. the course has a compulsory attendance requirement.</li></ol> Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: <a href="https://policies.newcastle.edu.au/document/view-current.php?id=236">https://policies.newcastle.edu.au/document/view-current.php?id=236</a>
<b>Important Policy Information</b>	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 <a href="https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures">https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures</a> 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.*

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