



ENVS808

Introduction to Geographic Information Science for Postgraduates

S1 Day 2017

Dept of Environmental Sciences

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General Information

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Credit points

4

Prerequisites

Admission to MEnv or MSc or GradDipEnv or GradCertEnv or MEnvEd or MEnvMgt or MEnvPlan or MPlan or MEnvStud or MSusDev or MWldMgt or MMarScMgt or GradDipSusDev or GradCertSusDev or GradCertSIA or GradDipSIA or MConsBiol or GradDipConsBiol or PGDipSc in Biodiversity Conservation

Corequisites

Co-badged status

Unit description

This unit provides students with a comprehensive introduction to geospatial technologies, including geographic information systems (GIS), global positioning systems (GPS) and remote sensing. Students will learn core concepts and develop advanced technical skills in data acquisition and management, mapping and spatial sampling and analysis. Students are provided training using the latest commercially available geospatial software. ENV5808 covers the application of geographic information science across a range of disciplines, including environmental science and management, physical and human geography and urban and environmental planning.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are

available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence

Perform basic operations using geographic information systems (GIS) and remote sensing software

Organise, analyse and interpret geographic information using a range of techniques

Effectively communicate the outputs of geographic analysis in both map and written formats

Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	5%	No	March 17 2017
Assignment 2	10%	No	April 7 2017
Assignment 3	17%	No	April 28 2017
Assignment 4	13%	No	May 26 2017
Quiz	10%	No	April 7 and June 9 2017
Final Exam	45%	No	Check exam timetable

Assignment 1

Due: **March 17 2017**

Weighting: **5%**

Report on the week 2 – 3 practical exercises using the ESRI ‘Virtual Campus’.

On successful completion you will be able to:

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Perform basic operations using geographic information systems (GIS) and remote

sensing software

- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assignment 2

Due: **April 7 2017**

Weighting: **10%**

Report on GIS essay topic.

On successful completion you will be able to:

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Effectively communicate the outputs of geographic analysis in both map and written formats
- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assignment 3

Due: **April 28 2017**

Weighting: **17%**

Report on the week 4 - 7

On successful completion you will be able to:

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Effectively communicate the outputs of geographic analysis in both map and written formats
- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assignment 4

Due: **May 26 2017**

Weighting: **13%**

Report on the week 8 - 11 practical exercises on data capture, raster analysis and advanced mapping.

On successful completion you will be able to:

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Effectively communicate the outputs of geographic analysis in both map and written formats
- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Quiz

Due: **April 7 and June 9 2017**

Weighting: **10%**

Two short quizzes on lecture topics.

On successful completion you will be able to:

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence

Final Exam

Due: **Check exam timetable**

Weighting: **45%**

Final exam covering all aspects of the unit.

On successful completion you will be able to:

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Effectively communicate the outputs of geographic analysis in both map and written formats

- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Delivery and Resources

ENV5808/708 provides students with a comprehensive introduction to geospatial technologies, including geographic information systems (GIS), global positioning systems (GPS) and remote sensing. Students will learn core concepts and develop technical skills in data acquisition and management, mapping and spatial sampling and analysis. Students are provided training using the latest commercially available geospatial software.

ENV5808's lectures cover a range of topics to introduce you to geographic information science, including: coordinate systems and map projections, how to create your own digital data, spatial analysis with vector and raster data, cartography (map making), remote sensing and 3D analysis. The practical classes apply standard geographic information science concepts and techniques to a range of disciplines, including environmental science and management, physical and human geography and urban planning.

Delivery

This unit is offered both internally and externally.

Lecture program and location

There is one 1 hour lecture per week. Please check lecture times and rooms at the Macquarie University timetables website (www.timetables.mq.edu.au). Lectures are recorded and posted to iLearn via Echo360. Internal students are expected to attend lectures *in person*; external students can access lectures through iLearn.

Practical program and location

There is three 3 hour practical class per week. Please check practical times and rooms at the Macquarie University timetables website (www.timetables.mq.edu.au). Practical class sizes are limited by the number of available computers. You must use the online enrolment system to change the time/day of your practical class. Practicals begin in Week 2.

If you would like to use your own computers, they must have Windows 7 or above, Vista or XP operating system (the ArcGIS software is NOT supported by Mac or Linux operating systems.). A copy of the ArcGIS software will be sent to all external students. You must install this software on your computer.

Workload

ENV5808 earns 4 credit points towards your degree. You are expected to invest at least 9 hours of study per week on average over the semester. This includes your lectures and practical exercises (4 hours per week), assignments and the final exam.

Submission of assignments

All students are required to keep a backup of the submitted version of their assessments.

Assignments should be in a MS Word or PDF file format. All maps and tables associated with the

assignment must be incorporated in the MS Word document or PDF.

Students are not permitted to email their assignments or submit them in a softcopy format. Assignments are to be submitted via the Turnitin link provided in iLearn by 5PM on the date specified.

How do I request an extension?

Extensions must be requested by email from the unit convenor prior to the assignment's due date (except in exceptional circumstances), and supported by appropriate documentation (e.g. a medical certificate).

Extensions will only be granted in writing (by email) at the discretion of the unit convenor. Otherwise, automatic penalties will apply. Assignments that are handed in late without an extension or exceptional circumstances will not be marked if they are submitted more than 7 days after the due date. If submitted within 7 days, marks will be deducted for lateness at the rate of 5% of the possible mark per day.

Return of marked assignments

Your assignments will be returned via iLearn within two teaching weeks of the submission, and will include written feedback.

Requirements to complete this unit satisfactory

1. Attend lecture and practical classes (internal students);
2. Complete all assignments and the final exam; and
3. Acquire a pass grade or above.

Grades for the unit as a whole will be awarded according to the following general criteria (course rubric).

	Developing	Functional	Proficient	Advanced
General description of the level of attainment	Has not yet reached the desired standard. Limited understanding of required concepts and knowledge. A fail grade (or under some circumstances a conceded pass) would be given	Has reached basic academic standards. Work has limited translation of concepts and procedures to new contexts unless aided. A pass grade would be awarded	Has completely reached the standards expected. Can work independently in new contexts, adapting procedures to meet the context. Demonstrates awareness of own limitations. A credit grade would be awarded.	Has gone beyond the expected standards. Exhibits high levels of independence and can use concepts to generate new ways of completing procedures. Can engage in critical reflection. A grade of distinction or high distinction would be awarded.

Resources

Technology used

This unit will use Echo360 and iLearn, and ArcGIS, Google Earth and MS Excel software, and GPS for the practical exercises.

You will require access to a computer and broadband internet to complete this unit. The library computers and computer labs are available for casual use outside scheduled practical classes.

Internal students who have a home computer with a Windows operating system may obtain a copy of the ArcGIS software from the unit convenor. The ArcGIS software is NOT supported by Mac or Linux operating systems. It is not essential for internal students to have ArcGIS installed on their home computer as the computers in the computer labs are available for casual use outside scheduled practical classes. However, external students must have ArcGIS installed on their home computer.

Unit web page

This unit's webpage will be available on iLearn. Information about how students can access iLearn can be found at: http://www.mq.edu.au/iLearn/student_info/index.htm

The iLearn page uses Macquarie University's standard interface and has links, access to lectures (as audio files through Echo360, and as downloadable PDF presentations) and practical instructions. Important announcements will be made through iLearn, so check the ENV5808 page regularly.

Information about how to access lecture recordings through the Echo360 EchoCenter page in iLearn can be found at: http://mq.edu.au/iLearn/student_info/lecture_recordings.htm

Required and recommended texts/materials

Chang, K. 2008. *Introduction to geographic information systems*. McGraw Hill, New York. [Available at Macquarie University Library].

Unit Schedule

Week	Lecturer	Lecture date	Lecture	Practical	Assessment	Assessment due date
1	Maina	28-Feb	Introduction to Geographic Information Science	No practical		
2	Maina	7-Mar	GIS basics: data formats and software demonstration	ESRI Training		
3	Maina	14-Mar	Coordinate systems and map projections	ESRI Training	Assign. 1	17-Mar-2017
4	Maina	21-Mar	Spatial analysis with vector data	GIS Techniques		
5	Maina	28-Mar	Spatial analysis with raster data	GIS Techniques		
6	Maina	4-Apr	How to make a map	GIS Techniques	Assign.2 & Quiz 1	7-Apr-2017
7	Maina	11-Apr	Creating digital data	GIS Techniques		
		17-Apr	SESSION 1 BREAK			
8	Michael	2-May	Remote Sensing 1: Terrain products, TIN & 3D	Raster Analysis	Assign.3	28-Apr-2017

9	Michael	9-May	Remote Sensing 2	Data Capture - Georeferencing and Digitising		
10	Michael	16-May	Online GIS	Data Capture - Georeferencing and Digitising		
11	Michael	23-May	GIS Projects, DFD, & ModelBuilder	Preparation and Presentation of Maps	Assign.4	26-May-2017
12	Maina	30-May	Introduction to GIS with Python & R	Using R for GIS		
13	Maina	6-Jun	Unit summary & exam preparation; GIS careers (re-visit)	No practical	Quiz 2	9-Jun-2017

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Identify and apply appropriate geographic information science concepts and techniques

to a range of contexts

Assessment task

- Assignment 4

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4
- Quiz
- Final Exam

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence

- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assessment tasks

- Assignment 2
- Assignment 3
- Assignment 4
- Quiz
- Final Exam

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Identify and define key concepts and principles of geographic information science, including scale, projections, interactions and interdependence
- Perform basic operations using geographic information systems (GIS) and remote sensing software
- Organise, analyse and interpret geographic information using a range of techniques
- Identify and apply appropriate geographic information science concepts and techniques to a range of contexts

Assessment tasks

- Assignment 2
- Assignment 3
- Assignment 4
- Final Exam

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual

formats.

This graduate capability is supported by:

Learning outcome

- Effectively communicate the outputs of geographic analysis in both map and written formats

Assessment task

- Assignment 4

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Assessment tasks

- Assignment 2
- Assignment 3

Changes from Previous Offering

In 2017 we have incorporated scripting using R and Python as part of our introduction to GIS course.

Changes since First Published

Date	Description
02/03/2017	Changed assignments' 3 & 4 submission dates on the unit schedule, and updated the staff contact details with office number