



# ENVS2364

## Introduction to Geographic Information Science

Session 1, Weekday attendance, North Ryde 2020

*Department of Earth and Environmental Sciences*

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## General Information

Unit convenor and teaching staff

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Appointment by email

Credit points

10

Prerequisites

ENV5117 or ENV51017 or COMP115 or COMP1000 or COMP125 or COMP1010 or  
ISYS100 or COMP1800 or ISYS104 or COMP1750 or STAT170 or STAT1170 or STAT171 or  
STAT1371

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 technical skills in data acquisition and management, mapping and spatial sampling and analysis. Students are provided training using the latest commercially available geospatial software. This unit covers the application of geographic information science across a range of disciplines, including environmental science and management, physical and human geography, urban planning and biodiversity conservation.

## 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:

**ULO1:** Perform basic operations using Geographic Information Systems (GIS) and Remote Sensing software

**ULO2:** Organise, analyse and interpret geographic or spatial information using a range of techniques

**ULO3:** Identify and define key concepts and principles of Geographic Information Science, including scale, projections, interactions and interdependence

**ULO4:** Communicate geographic/spatial analysis outputs using maps and written formats

**ULO5:** Apply standard Geographic Information Science concepts and analytical techniques to a range of contexts

## Assessment Tasks

### Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult [iLearn](#) for revised unit information.

[Find out more about the Coronavirus \(COVID-19\) and potential impacts on staff and students](#)

## Delivery and Resources

### Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19.

Please check here for updated delivery information: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

ENV52364 is an introductory course to Geographic Information Systems (GIS). It provides students with a comprehensive introduction to geospatial technologies, including GIS, Global Positioning Systems (GPS) and Remote Sensing. Students will learn core concepts and principles of GIS, and develop technical skills in data acquisition and management,

mapping, spatial sampling and analysis. Students are trained using the latest commercial geospatial softwares.

ENV52364's lectures cover a range of topics which are key to one becoming competent in Geographic Information Science. These include a background on how the shape of the earth impacts on mapping, also referred to as coordinate systems and map projections, creating and collecting GIS data, spatial analysis using different GIS data types, the art of map making, remote sensing and working with three-dimensional features or data. The practical classes are designed to expose students practice and apply standard GIS concepts and techniques to a range of disciplines, including environmental science and management, physical and human geography and urban planning and biodiversity conservation.

### **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](http://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 recordings through the iLearn.

### ***Practical program and location***

**Internal students:** Students are enrolled to one 3 hour practical class per week. Please check practical times and rooms at the Macquarie University timetables website ([www.timetables.mq.edu.au](http://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. Practical classes begin in Week 1.

**External students:** You must have a home computer with a Windows operating system (Windows 7 or above). Please note that ArcGIS software is NOT supported by Mac or Linux operating systems. Also, we don't provide IT support for installation to Mac or Linux platforms. A copy of the ArcGIS software will be provided to external students. You must install this software on your computer. Internal students may also request a copy of the software and license to install to their personal computers.

### ***Workload***

ENV52364 earns 3 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 and progress tasks***

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 the date and time specified.

### **Late Submission**

Late submissions will attract a penalty of 5% of the available marks per day after the original assessment due date until the mark becomes 0%. Assessment more than 7 days late will receive a mark of zero for non-submissions. Extensions will be granted in cases of documented illness or extenuating circumstances, and when applied for BEFORE the assessment deadline.

Applications for assessment extensions are now to be applied online via the [student portal](#).

Please follow the instructions outlined at <https://students.mq.edu.au/study/my-study-program/special-consideration>. Extension requests received via email or after the due date will not be processed.

Please be aware that there is a minimum processing time of 2 working days for all extension requests. If you submit your request on the due date of the assessment item, we cannot guarantee that you will receive a response by the assessment deadline. Where possible, please factor this in when submitting your extension application.

### **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
<b>General description of the level of attainment</b>	Has not yet reached the desired standard. Limited understanding of required concepts and knowledge.  A <b>fail</b> 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 <b>pass</b> 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 <b>credit</b> 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 <b>distinction</b> or <b>high distinction</b> would be awarded.

## **Resources**

### **Technology used**

This unit will use the online platform of Echo360 and iLearn, ArcGIS, Google Earth, MS Excel software, GPS, and online resources 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.** We are also trialing the remote access of ArcGIS by external students via *Appstream*. More information will be provided regarding this service.

### ***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](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 ENV52364 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](http://mq.edu.au/iLearn/student_info/lecture_recordings.htm)

### ***Recommended texts/materials***

Highly recommend a fast USB Flash Storage Drive (4GB is adequate) for GIS Practicals; if your computer supports USB3 then I would further suggest a USB3 storage drive as the GIS Lab PC's support USB3.

Access to required and recommended resources, plus past central exam papers, is available at the Macquarie Library website (<https://www.mq.edu.au/about/campus-services-and-facilities/library/multi-search/multisearch>).

**GIS Desktop Software.** The University has a site license for ESRI's ArcGIS ([www.arcgis.com](http://www.arcgis.com)) which may be installed on a Windows PC with reasonable specs (i.e. 4GB RAM and 2.2 GHz CPU).

Chang, K. 2008. *Introduction to geographic information systems*. McGraw Hill, New York.

Jensen J. & Jensen R. (2012) *Introductory Geographic Information Systems*, Pearson Higher Ed.

Longley, P., Goodchild, et al. (2005) *Geographical Information Systems and Science*.

Burrough PA, McDonnell RA, and Lloyd C. 2015. *Principles of Geographic Information Systems*. Oxford University Press, UK.

Huisman O, de By RA (Eds). *Principles of Geographic Information Systems: An Introductory Text Book*: Available online at: [https://www.itc.nl/library/papers\\_2009/general/PrinciplesGIS.pdf](https://www.itc.nl/library/papers_2009/general/PrinciplesGIS.pdf)

The Khan Academy has many short instructional videos on a range of topics; the statistics (Maths) and SQL (Computing, Programming) provide background learning relevant to GIS.

<http://www.khanacademy.org>

## Unit Schedule

### Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult [iLearn](#) for latest details, and check here for updated delivery information: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

Week	Date	Description	Practical
1	27-Feb	Introduction to Geographic Information Science: what is GIS, what is it used for, what are the career pathways in GIS?	(1) Getting Started with GIS, Data Formats, Software
2	5-Mar	Types of GIS data: Vector Data & Spatial analyses using vector data	(1) Getting Started with GIS, Data Formats, Software
3	12-Mar	Planet Earth is not, in fact, perfectly round: Coordinate systems and map projections	(2) Geo-processing methods
4	19-Mar	The art of map making	(2) Geo-processing methods
5	26-Mar	Types of GIS data: Raster Data & Spatial analyses using vector data	(2) Geo-processing methods
6	2-Apr	Capturing physical features on earth surface using GIS	(3) Data Capture; Geo-referencing and Digitising
7	9-Apr	Careers in GIS (and in general) - delivered by Professional Australia	(3) Spatial Analyses with Raster
8	30-Apr	Starting a GIS Project: Data Flow Diagrams & ModelBuilder, ArcGIS Pro/ Online	(3) Preparation and Presentation of Maps
9	7-May	Remote Sensing: Surface elevation and Terrain products, raster and TIN, 3D	(3) Spatial Analyses with Raster
10	14-May	Remote Sensing of the Environment	(3) Remote Sensing
11	21-May	Geo-scripting & spatial statistics 1	(3) Geo-scripting & spatial statistics



Week	Date	Description	Practical
12	28-May	Geo-scripting & spatial statistics 2	(3) Geo-scripting & spatial statistics
13	4-Jun	Unit summary	No practical

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## 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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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/](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.

## Changes from Previous Offering

### Course Changes as informed by Previous Student Feedback

Feedback shows some concern on extent of course content and assessment; this is mostly dealt with over the semester but will make a point to explain the most 'time-efficient' way to complete required learning in the first few lectures.