ENVS390

Applied GIS

S2 Day 2018

Dept of Environmental Sciences

Contents

General Information

Unit convenor and teaching staff
Lecturer/convenor
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Contact via email
Room 406, Level 4, 12 Wally's Walk (E7A)
by appointment

Credit points
3

Prerequisites
39cp at 100 level or above including (ENV264 or ENVS264 or GEOS264) and 3cp from ENVE or ENVG or ENV or GEOP units at 300 level)

Corequisites

Co-badged status

Unit description
Geographic information systems (GIS) are used for data storage, visualisation (mapping), and the provision of information to support decision making. This unit expands on ENVS264 by applying advanced GIS concepts and techniques within the context of urban and regional management. This unit is a participation unit and is designed to provide students with skills that enhance their educational experience and work-readiness in the field of urban and regional management.

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:

Analyse and interpret spatial information from urban and regional management agencies

Design and execute advanced spatial analysis in GIS

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

Apply advanced GIS concepts and techniques to real-world urban and regional management problems

General Assessment Information

Assignments and quiz will be submitted via the submission links provided on iLearn page of the unit.

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the week of December 17-21 2018. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	15%	No	Week 5
Assignment 2	15%	No	Week 9
Assignment 3	25%	No	Week 12 & 13
Assignment 4	5%	No	Week 7
Final Exam	40%	No	Check exam timetable

Assignment 1

Due: **Week 5**
Weighting: **15%**

Due: **Week 5** Weighting: **15%**

A report on the week 1 – 4 practical exercises.

This Assessment Task relates to the following Learning Outcomes:

- 1. Analyse and interpret spatial information from urban and regional management agencies
- 3. Effectively communicate the outputs of spatial analysis in both map and written formats

On successful completion you will be able to:

- Analyse and interpret spatial information from urban and regional management agencies

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

Assignment 2

Due: **Week 9**
Weighting: **15%**

A report on the land use and floor space field study and 3D visualisation.

This Assessment Task relates to the following Learning Outcomes:

- 1. Analyse and interpret spatial information from urban and regional management agencies
- 2. Design and execute advanced spatial analysis in GIS
- 3. Effectively communicate the outputs of spatial analysis in both map and written formats
- 4. Apply advanced GIS concepts and techniques to real-world urban and regional management problems

On successful completion you will be able to:

- Analyse and interpret spatial information from urban and regional management agencies
- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assignment 3

Due: **Week 12 & 13**
Weighting: **25%**

A group project on using the GIS network analysis or regression model for regional planning studies.

The project is due in week 12, followed by the presentation in week 13.

This Assessment Task relates to the following Learning Outcomes:

- 1. Analyse and interpret spatial information from urban and regional management agencies
- 2. Design and execute advanced spatial analysis in GIS
- 3. Effectively communicate the outputs of spatial analysis in both map and written formats
- 4. Apply advanced GIS concepts and techniques to real-world urban and regional

management problems

On successful completion you will be able to:

- Analyse and interpret spatial information from urban and regional management agencies
- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assignment 4

Due: **Week 7**
Weighting: **5%**

A quiz on lecture and practical topics covered in weeks 1-7.

This Assessment Task relates to the following Learning Outcomes:

- 4. Apply advanced GIS concepts and techniques to real-world urban and regional management problems

On successful completion you will be able to:

- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Final Exam

Due: **Check exam timetable**
Weighting: **40%**

Final exam covering all aspects of the unit.

This Assessment Task relates to the following Learning Outcomes:

- 2. Design and execute advanced spatial analysis in GIS
- 3. Effectively communicate the outputs of spatial analysis in both map and written formats
- 4. Apply advanced GIS concepts and techniques to real-world urban and regional management problems

On successful completion you will be able to:

- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats

- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Delivery and Resources

Planning and management agencies use geographic information systems (GIS) for data storage, visualization (mapping), and the provision of information to support decision making. Having completed the unit ENV(S)264 (Introduction to Geographic Information Science), you have acquired the basic skills to drive a GIS and to perform some of these tasks. In ENVS390, you build on this fundamental knowledge by learning to apply advanced GIS concepts and techniques within the context of urban and regional management.

ENVS390 is a **PACE** and **CAPSTONE** unit of the major of spatial information science (SIS), and is designed to integrate student's knowledge and experiences from their whole program in preparation for the next stage of their careers. ENVS390's lectures cover a range of topics to assist you in advancing from the basic skills required to drive a GIS (i.e. ENVS264) to working with a GIS in urban and regional management, including: where to find spatial data and how to create your own spatial data, advanced editing, spatial and pattern analysis with vector data, 3D analysis and visualization, network analysis and web GIS. This unit provides you with advanced GIS skills that are applicable to a wide range of agencies tasked with urban and regional management.

Delivery

Lecture program and location

This unit is only offered **internally**. Please check lecture times and rooms at the Macquarie University timetables website (www.timetables.mq.edu.au).

Practical program and location

There is one 3 hour practical class per week. Please check practical times and rooms at the Macquarie University timetables (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 1**.

Field work

There is one **compulsory** field work activity in this unit during which students record property land use and built form data within the local council areas. Assignment 2 is based on this field work. **The field work activity is conducted by students during week 7 and the session 2 break *at their leisure*** (i.e. students have the freedom to decide when they, as an individual or group, conduct the field work activity). Students will need to arrange their own transport and personal field equipment. Further details on the field work activity and the field work induction will be provided during the Week 6 lecture. **You must attend the Week 6 lecture and conduct the field work induction before proceeding with the field work activity.**

Workload

ENVS390 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

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 hardcopy format. Assignments are to be submitted via the link provided in iLearn by the deadline specified.

How do I request an extension?

Extensions must be requested via **ask.mq.edu.au**, 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 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

- Acquire a **pass grade** or above.

Resources

Technology used

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

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

Students who have a home computer with a Windows 7 or higher 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 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.

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

Required and recommended texts/materials

There are no prescribed texts for this unit. However, there will be recommended reading associated with some lectures.

Health and safety during field work

Assignment 2 includes a field activity that takes place in premises other than the University. **Any student who has a disability that may limit their participation in field work or that could result in a medical emergency in the field should notify the Unit Convenor immediately.** As a general guide to the level of physical fitness required, you should be able to walk 5 km over footpaths in a few hours.

A PACE Activity is an experiential activity allocated to, and undertaken by, a student within a PACE unit which may take place in premises other than the University (usually the Partner Organisation's premises). When working or studying in non-University premises, the primary responsibility for the health and safety of our students becomes that of the Partner Organisation hosting the student. However, as a student, you also have a legal responsibility under the Workplace Health & Safety Act 2011 and the Macquarie University Health & Safety Policy to ensure the health and safety of yourself and of others in the workplace.

Each student has a moral and legal responsibility for ensuring that his or her work environment is conducive to good health and safety, by:

1. ensuring that their work and work area is without risk to the health and safety of themselves and others
2. complying with the University's and Partner Organisation's Work Health & Safety Policy and Procedures
3. reporting hazards and incidents as they occur in accordance with University and Partner Organisation's policy
4. actively participating in all health and safety activities and briefing sessions (eg emergency evacuation procedures, site inspections etc)

Each student is also required to advise their Unit Convenor or Faculty PACE Manager as soon as possible when:

1. he/she feels unsafe at any stage during the PACE activity
2. he/she did not receive a safety induction prior to the commencement of the activity covering: First aid, Fire and emergency evacuation; and Injury/incident reporting

3. he/she did not receive any specialised instructions/training necessary to carry out the role
4. an incident/accident happens (even when reported to the Partner Organisation/ supervisor and managed by them)

Non-compliance with the above may result in withdrawal of the student from the PACE Activity.

Students in the Faculty of Science should also be familiar with Faculty-specific practices as appropriate: http://web.science.mq.edu.au/intranet/ohs/

Students should note the information below in case they find themselves in any emergency situations.

- Remove yourself from any danger.
- Call 000, if necessary.
- Speak to your partner-based supervisor, if possible. The Organisation may have emergency procedures to follow.

THEN - if the emergency occurs in office hours (i.e. Monday - Friday 9am-5pm)

- Contact your Unit Convenor by phone/email as soon as you can.
- If you cannot reach your Unit Convenor, contact your Faculty PACE Manager by phone/ email.

OR - if the emergency occurs outside of office hours (i.e. outside of Monday - Friday 9am-5pm)

- Phone Campus Security Office on (02) 9850-9999 as soon as you can. This is a 24 hour, 7 days a week service and it does not matter where in Australia you are when you call. Please identify yourself as a PACE student when you call.

N.B. For any minor issues with your participation activity, please speak to your partner-based Supervisor. If the problem is more serious, please contact your Unit Convenor or your Faculty PACE Manager.

If you are experiencing difficulties and need to speak to a counsellor:

- Contact the MQ Counselling Service at Campus Wellbeing on 9850-7497 (Monday - Friday, 8am-6pm)
- 1800 MQ CARELINE (1800-227-367) - information and referral service (24 hours, 7 days a week)
- If you would like to speak to a counsellor outside of office hours, you can also contact Lifeline on 13 11 14 (24 hours, 7 days a week).

Unit Schedule

Week	Lecture Topic
1	Introduction to ENVS390
2	Advanced editing
3	Spatial analysis and patterns of vector data
4	3D analysis and visualisation
5	Scripting in GIS
6	GIS and land use (Guest lecture)
7	Geodatabase
8	Regression
9	Network analysis
10	GIS and transport (Guest lecture)
11	Web GIS
12	Other GIS software
13	Unit summary

** The order of the lecture topics may change slightly depending on guest lecturer's availability.*

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). 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.)*

Undergraduate students seeking more policy resources can visit the 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).

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 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

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

- Assignment 2
- Assignment 3
- Final Exam

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Analyse and interpret spatial information from urban and regional management agencies
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

- Assignment 2
- Final Exam

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue

knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcomes

- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats

Assessment tasks

- Assignment 2
- Assignment 3

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Analyse and interpret spatial information from urban and regional management agencies
- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

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

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate

and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Analyse and interpret spatial information from urban and regional management agencies
- Design and execute advanced spatial analysis in GIS
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

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

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Analyse and interpret spatial information from urban and regional management agencies
- Design and execute advanced spatial analysis in GIS
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

- Assignment 1
- Assignment 2
- Assignment 3
- Assignment 4

- Final Exam

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

- Assignment 2
- Assignment 3
- Final Exam

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Analyse and interpret spatial information from urban and regional management agencies
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment task

- Assignment 3

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and

country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Analyse and interpret spatial information from urban and regional management agencies
- Effectively communicate the outputs of spatial analysis in both map and written formats
- Apply advanced GIS concepts and techniques to real-world urban and regional management problems

Assessment tasks

- Assignment 2
- Assignment 3