ENVS3383

Environmental Analysis Using Remote Sensing and GIS

Session 2, Special circumstances 2021

Archive (Pre-2022) - Department of Earth and Environmental Sciences

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

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Credit points
10

Prerequisites
(130cp at 1000 level or above) including (ENV264 or ENVS264 or ENVS2364 or GEOS264)

Corequisites

Co-badged status

Unit description
*This unit has an online offering for S2 which is **synchronous**, meaning there will be set times to attend online lectures and tutorials.*

This unit provides students with an understanding of advanced spatial information science (SIS) procedures, and experience in the implementation of geographic information systems (GIS) and remote sensing (RS) in environmental fields. The unit covers modelling landforms and other environmental variables in GIS, an introduction to geostatistics, and a range of case studies from areas including catchment hydrology, climate variables, natural hazards and vegetation mapping. It also demonstrates advanced RS techniques to derive spatial information on land cover and land cover change, and the latest satellite programs. The GIS software used is ArcGIS. Students enrolling in this unit must have access to a computer with the Windows operating system. Mac or Linux system will not be supported.

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: Demonstrate knowledge of the principles underlying GIS raster analyses

ULO2: Apply GIS modelling techniques to make an evidence-based multi-attribute decision making

ULO3: Effectively communicate information derived using spatial analyses

ULO4: Describe and critique current applications of GIS and RS in Australia and worldwide

ULO5: Evaluate remotely sensed data acquired from a range of sensors

ULO6: Competently apply a wide range of techniques for RS data to provide information about the environment

General Assessment Information

Assessment Criteria

Assessment at Macquarie University is standards-based, as outlined in the Assessment Policy. This means that your work will be assessed against clear criteria, and these criteria (e.g. in a rubric) will be made available when the assessment tasks are released to you on iLearn.

This unit does not have a Hurdle Requirement

Submission of Assessments

All assessments must be submitted online through Turnitin unless otherwise indicated. Links for the submission of each assessment will be available in iLearn.

You should always check that you have uploaded the correct file. If you have a problem, please email the Unit Convenor with your correct file. You must also keep a copy of your assessments until the end of semester in case there is a problem with your submission. It is your responsibility to ensure that you can provide a copy of your assessment if requested.

Marking of Assessments

Assignments will usually be marked through Turnitin with grades provided through Gradebook in iLearn. Please do not submit your assessments via email or in hard copy unless requested (e.g. a sketch or drawing).

We aim to return your assessment grades and feedback within two to three weeks of the date that you submitted it. We appreciate your patience and will advise you through iLearn when your marked assessments and feedback are available for viewing.

Penalties for Late Assessments

The penalty for late submission of assessments in this unit is ***ten percent (10 %) of the assessment value per day***, calculated from the due time and date. This means that if the assignment is worth a total of 30 marks (or 30 % of the unit) you will lose 3 marks for each day it is late. This is a hefty penalty designed to make you aware of the importance of organising yourself around assessment due dates. The penalty will be applied over weekdays and weekends unless you have been granted an extension **prior to the due date**.

Extensions for Assessments

To obtain an extension for an assessment task, you will need to follow the formal process as outlined in the Special Consideration Policy, and you must provide appropriate supporting evidence (e.g. medical certificate - see advice for Special Consideration requests). The final decision regarding the granting of an extension lies with the unit convenor. Permission for extensions must be sought ***before the due date*** unless there are exceptional circumstances. Please let us know of problems in advance or as soon as possible, not after the event. We are likely to be much more sympathetic and able to accommodate your circumstance if you follow this advice.

Exams

Details of exam conditions and timetables can be found on the Exams and Results portal. The draft exam timetable will be released approximately eight weeks before the commencement of the exams. The final exam timetable will be published 4 weeks before commencement. All students (including exchange students) are expected to present themselves for the exam at the time and place designated in the exam timetable. Note this may include weekends.

For unavoidable disruptions during exams, you should apply for Special Consideration as soon as possible. If a Supplementary Examination is granted as a result of the Special Consideration process, the exam time will be scheduled after the conclusion of the official examination period and you will receive an individual notification prior to the exam with the exact date and time of the Supplementary Examination. You will only be allowed one opportunity to sit the Supplementary Exam as outlined in the Special Consideration Policy

Assessment Tasks

Name	Weighting	Hurdle	Due
Literature Review	10%	No	Week 4
Project for Remote Sensing and Image Interpretation	30%	No	Weeks 2 - 8
GIS Modelling using Raster Data	20%	No	Weeks 9 -13
Final Exam	40%	No	Exam Period

Literature Review

Assessment Type [1]: Literature review
Indicative Time on Task [2]: 12 hours
Due: **Week 4**
Weighting: **10%**

In this assignment, students are asked to conduct a literature review on a specific application of remote sensing.

On successful completion you will be able to:

- Describe and critique current applications of GIS and RS in Australia and worldwide
- Competently apply a wide range of techniques for RS data to provide information about the environment

Project for Remote Sensing and Image Interpretation

Assessment Type [1]: Project
Indicative Time on Task [2]: 25 hours
Due: **Weeks 2 - 8**
Weighting: **30%**

This project brings together what students learned through lectures and practicals and applies remote sensing and its methods to an application nominated by students. Students will present their findings using both oral presentation and report.

On successful completion you will be able to:

- Demonstrate knowledge of the principles underlying GIS raster analyses
- Effectively communicate information derived using spatial analyses
- Describe and critique current applications of GIS and RS in Australia and worldwide
- Evaluate remotely sensed data acquired from a range of sensors
- Competently apply a wide range of techniques for RS data to provide information about the environment

GIS Modelling using Raster Data

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 15 hours
Due: **Weeks 9 -13**
Weighting: **20%**

Students will undertake a multi-criteria analysis using GIS and gain experience with a range of GIS techniques on raster analyses and modelling for site selections.

On successful completion you will be able to:

- Demonstrate knowledge of the principles underlying GIS raster analyses
- Apply GIS modelling techniques to make an evidence-based multi-attribute decision making
- Effectively communicate information derived using spatial analyses
- Competently apply a wide range of techniques for RS data to provide information about the environment

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 29 hours
Due: **Exam Period**
Weighting: **40%**

Final exam

On successful completion you will be able to:

- Demonstrate knowledge of the principles underlying GIS raster analyses
- Apply GIS modelling techniques to make an evidence-based multi-attribute decision making
- Describe and critique current applications of GIS and RS in Australia and worldwide
- Evaluate remotely sensed data acquired from a range of sensors
- Competently apply a wide range of techniques for RS data to provide information about the environment

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Lecture program

- There is one online lecture per week. Please check lecture time at the Macquarie

University Timetables website: https://timetables.mq.edu.au

- Zoom links will be provided in iLearn page of the unit.

Practical program

- There is one three-hour practical class from weeks 1 to 12 for ALL students. Please check prac time and location (including online session) at the Macquarie University Timetables website: https://timetables.mq.edu.au; Zoom links will be provided in iLearn page of the unit.
- The recordings of lectures and practical demonstrations will be made available via Echo360 after each class.
- ESRI GIS software, ArcMap, and the remote sensing software, ENVI, are used in this unit. Both software will be accessible via AppStream at https://mq.okta.com/
- There is NO on-campus session.

Unit Schedule

Week	Lecture Topic
1	Introduction to the unit and recap
2	Fundamental of Remote Sensing
3	Spectral Indices
4	Classifications
5	Light Detection and Arranging (LiDAR) and applications
6	Radar (Microwave) Remote Sensing and applications Part 1
7	Radar (Microwave) Remote Sensing and applications Part 2
8	GIS Modelling – Site Selection
9	GIS Modelling – Bushfire Risk Modelling Part 1
10	GIS Modelling – Bushfire Risk Modelling Part 2
11	GIS Modelling – Bushfire Risk Modelling Part 3
12	RS Applications and Earth Observation Program

13	Unit Summary

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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

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

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/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 or if you are a Global MBA student contact 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) 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

If you are a Global MBA student contact 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/.

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.