



# ENVG850

## Introduction to Remote Sensing

S2 Day 2014

*Dept of Environment & Geography*

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## General Information

Unit convenor and teaching staff

Unit Convenor

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Credit points

4

Prerequisites

Admission to MClmCh or MEnv or MSc in Remote Sensing and GIS or PGDipSc in Remote Sensing and GIS or PGCertSc in Remote Sensing and GIS

Corequisites

Co-badged status

Unit description

Remote sensing is the science of obtaining information about the Earth's surface without physically being in contact with it. Using various sensors, the characteristics of imaged objects can be observed and analysed at various wavelengths of electromagnetic waves. This unit teaches the principles of remote sensing, and introduces a wide range of sensors and their platforms. The up-to-date optical and radar remote sensing techniques will be demonstrated. The applications of integrating remote sensing and geographic information systems (GIS) are also demonstrated in this unit.

## 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:

- Understand the principles of remote sensing and how electromagnetic radiation interact with the objects on the Earth's surface
- Analyse remotely sensed imagery to extract useful information
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing

data acquired at different wavelengths of electromagnetic radiation and by various sensors.

Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## General Assessment Information

### SUBMISSION OF ASSIGNMENTS

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

Assignment reports will be submitted electronically, either in MS Word or PDF format, via the submission links provided on iLearn page.

### *Late Submission Penalty*

No extensions will be granted without a medical certificate or similar documentation. A penalty of 5% per day will be deducted from the total mark of the assessment task that is handed in late without an extension.

### *Special Consideration*

The University recognises that students may experience disruptions that adversely affect their academic performance in assessment activities. The Disruption to Studies Notification must be completed and submitted online through [www.ask.mq.edu.au](http://www.ask.mq.edu.au) within five (5) working days of the commencement of the disruption. [Disruption to Studies Policy](#) can be found at: [http://students.mq.edu.au/student\\_admin/exams/disruption\\_to\\_studies/](http://students.mq.edu.au/student_admin/exams/disruption_to_studies/)

## Assessment Tasks

Name	Weighting	Due
<a href="#">Quiz</a>	10%	week 7
<a href="#">Review report</a>	15%	week 10
<a href="#">Oral presentation</a>	10%	week 12
<a href="#">Prac Tasks</a>	10%	throughout the semester
<a href="#">Final exam</a>	55%	Check Exam Timetable

### Quiz

Due: **week 7**

Weighting: **10%**

Quiz on lecture topics in weeks 1-7.

On successful completion you will be able to:

- Understand the principles of remote sensing and how electromagnetic radiation interact with the objects on the Earth's surface
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## Review report

Due: **week 10**

Weighting: **15%**

Students are asked to choose one current or planned remote sensing sensor (mission) and discuss the possible applications, as well as, pros and cons.

Report length: approximately 1200~1500 words

On successful completion you will be able to:

- Analyse remotely sensed imagery to extract useful information
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## Oral presentation

Due: **week 12**

Weighting: **10%**

A 10 minute oral presentation to summarise the findings of the student's remote sensing sensor review report.

On successful completion you will be able to:

- Have insights into current applications of remote sensing and GIS in Australia and

worldwide

- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.

## Prac Tasks

Due: **throughout the semester**

Weighting: **10%**

Participation and completion of practical tasks.

On successful completion you will be able to:

- Analyse remotely sensed imagery to extract useful information
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## Final exam

Due: **Check Exam Timetable**

Weighting: **55%**

Final exam (3 hours)

On successful completion you will be able to:

- Understand the principles of remote sensing and how electromagnetic radiation interact with the objects on the Earth's surface
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## Delivery and Resources

### Delivery

Session 2 Day, North Ryde

### Lecture program and location

There is a two-hour lecture per week. Please check lecture time and location at the Macquarie University Timetables website: <https://timetables.mq.edu.au>.

### Practical program

There is one two-hour practical class from weeks 2 to 12. Please check prac time and location at the Macquarie University Timetables website: <https://timetables.mq.edu.au>.

### Requirements to complete this unit satisfactory

- Attend all lecture and practical sessions;
- Acquire a pass grade or above of the total grade of all assessments.

### Recommended Texts

There are no prescribed texts for this unit. A recommended book is available from MQ library.

Lillesand, T., Kiefer, R. and Chipman, J. 2008. Remote sensing and image interpretation. NJ: John Wiley & Sons (MQ library code: G70.4 .L54 2008)

### Unit webpage and technology used and required

#### Unit web page

The iLearn web page of this unit can be accessed at <http://ilearn.mq.edu.au>

#### Technology used

- iLearn and Echo360 for assisting learning;
- iLab is used for students to access ENVI software outside campus;
- Assignment reports need to be submitted electronically via the links on iLearn.

## Unit Schedule

Week	Lecture	Practical	Assessment Task Due
1	Introduction of Remote Sensing	No prac	
2	Electromagnetic radiation theory	ENVI Software Intro	
3	Electromagnetic radiation theory	ENVI Software Intro	
4	Spectral reflectance	ERDAS Software Intro	

5	atmospheric effect	Image calibration	
6	RS sensors	Classification	
7	(TBA)	(TBA)	Quiz
Semester break			
8	(TBA)	(TBA)	
9	Photogrammetry and LiDAR	Working with LiDAR data	
10	Radar - basic	Radar image processing	Review Report
11	Radar - image processing	Radar image processing	
12	Student Oral Presentations	Student Oral Presentations	Presentation
13	Unit summary	No prac	

## 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](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

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

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

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

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html) *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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/](https://students.mq.edu.au/support/student_conduct/)

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

## IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

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

## Graduate Capabilities

### 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

- Understand the principles of remote sensing and how electromagnetic radiation interact with the objects on the Earth's surface
- Analyse remotely sensed imagery to extract useful information
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.



- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## **Assessment tasks**

- Quiz
- Review report
- Oral presentation
- Prac Tasks
- 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**

- Understand the principles of remote sensing and how electromagnetic radiation interact with the objects on the Earth's surface
- Analyse remotely sensed imagery to extract useful information
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## **Assessment tasks**

- Quiz
- Review report
- Prac Tasks
- 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**

- Analyse remotely sensed imagery to extract useful information
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

### **Assessment tasks**

- Review report
- Prac Tasks

## **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**

- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.

### **Assessment tasks**

- Review report
- Oral presentation
- Final exam

## **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

- Understand the principles of remote sensing and how electromagnetic radiation interact with the objects on the Earth's surface
- Analyse remotely sensed imagery to extract useful information
- Have insights into current applications of remote sensing and GIS in Australia and worldwide
- Understand some concepts and issues when choosing and analysing remote sensing data acquired at different wavelengths of electromagnetic radiation and by various sensors.
- Have a thorough knowledge of remote sensing techniques on which to build more specialist study or lifelong learning

## Assessment tasks

- Quiz
- Review report
- Prac Tasks
- Final exam

## Changes from Previous Offering

The assessment weightings have been slightly modified. Student oral presentation is introduced this year as a new assessment task.