GEOS2311

Geophysical Methods for Earth and Environmental Sciences

Session 1, Fully online/virtual 2021

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

Contents

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Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff
Lecturer - Convenor
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Credit points
10

Prerequisites
10cp from GEOS units at 1000 level

Corequisites

Co-badged status

Unit description
Geophysical methods are the most cost-effective, environmentally safe and widely used approaches to characterise the sub-surface conditions for environmental, geotechnical, hydrogeology, engineering, archaeology and geology studies, to name a few. This unit introduces the most important geophysical methods currently used by engineers, earth and environmental scientists to understand and provide solutions to a large number of scientific and society-relevant problems (infrastructure development, groundwater contamination, geohazards, urban development, resource exploration, monitoring of pollution plumes, etc). Included are the methods of collecting and interpreting gravity, magnetic, seismic and electrical data and their use in mapping and charactering subsurface conditions. Practical classes involve reducing and interpreting geophysical data from earth and environmental problems. Data from a field survey is used to interpret the geological structure and environmental aspects of the dataset.

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 a sound understanding of the basic concepts of geophysics

ULO2: operate geophysical equipment

ULO3: demonstrate an understanding of the fundamentals in modelling and interpreting geophysical data

ULO4: apply knowledge to solving geophysical problems and evaluating ideas and information

ULO5: effectively present ideas with supporting evidence

General Assessment Information

If you require special consideration for the final exam, I urge you to communicate this to the convenor as soon as possible. A supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. 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. You can check the supplementary exam information page on FSE101 in iLearn (bit.ly/FSESupp) for dates, and 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
Field Data Report	26%	No	Week 13
Final Examination	50%	No	TBA
Quizzes	24%	No	week 4, 7, 10 and 13

Field Data Report

Assessment Type [1]: Report
Indicative Time on Task [2]: 30 hours
Due: **Week 13**
Weighting: **26%**

Report on analysis of existing data from a field area.

On successful completion you will be able to:

- demonstrate a sound understanding of the basic concepts of geophysics
- operate geophysical equipment
- demonstrate an understanding of the fundamentals in modelling and interpreting geophysical data
- apply knowledge to solving geophysical problems and evaluating ideas and information
- effectively present ideas with supporting evidence

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 35 hours
Due: **TBA**
Weighting: **50%**

The examination will consist of a number of short answer questions on definitions and concepts, followed by an essay section requiring further description of concepts and theory.

On successful completion you will be able to:

- demonstrate a sound understanding of the basic concepts of geophysics
- effectively present ideas with supporting evidence

Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 12 hours
Due: **week 4, 7, 10 and 13**
Weighting: **24%**

The quizzes will consist of short answer or multiple choice questions relating to the practical work and lecture material from the period preceding the quiz.

On successful completion you will be able to:

- demonstrate a sound understanding of the basic concepts of geophysics
- apply knowledge to solving geophysical problems and evaluating ideas and information

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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

Recommended Texts and/or Materials

The recommended textbook for the unit is MUSSETT and KHAN (Looking into the Earth, 2000). The book is available from the library as hard copies and digital access. Copies of the PowerPoint's shown in the lectures will be available on the unit's WEB page. The recommended textbook is an excellent text for second year, but you can also consider some of the third year textbooks as well.

The texts you should first consider are SHARMA (Environmental and Engineering Geophysics, 1997) and REYNOLDS (An Introduction to Applied and Environmental Geophysics, 1997), because they cover all the major geophysical topics. They have the further advantage of consistently using the SI system of units.

In the past we used a text by SHARMA (Geophysical Methods in Geology, 2nd Ed, 1986), but this is now out of print. SHARMA covers the global aspect of geophysics in more detail and is a useful reference to have if you can find a 2nd hand copy. In 1998, we used PARASNIS (Principles of Applied Geophysics, 5th Ed) but a change in publisher meant a massive increase in its cost. However, it is a useful text to refer to if you can find a 2nd hand copy. Other useful textbooks can be found in the unit outline in the iLearn page.

Technology Used and Required

The unit also has a WEB site which can be found through the iLearn WEBSITE at https://ilearn.mq.edu.au/login/MQ/ . This site contains information such as copies of colour images, copies of PowerPoint's shown in class, and copies of the practicals that we do in class. The WEB site will also allow access to the digital version of the lectures recorded through the iLecture system. As well, this site will access the on-line quizzes that will need to be completed during the Session. At the start of the year you should be issued with a username and password (Macquarie oneID) to access all the WEB sites available for the units you have taken. This will get you into the front page of the GEOS2311 WEB site.

Information for students about access to online units is available at

https://ilearn.mq.edu.au/

I recommend that you use Mozilla Firefox as your browser, as it seems to have far less problems than Internet Explorer with iLearn

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.