



GEOS811

Advanced Field Techniques in Geoscience

S3 External 2017

Dept of Earth and Planetary Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	5
<u>Delivery and Resources</u>	8
<u>Unit Schedule</u>	9
<u>Policies and Procedures</u>	10
<u>Graduate Capabilities</u>	11

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General Information

Unit convenor and teaching staff

Unit convenor

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Credit points

4

Prerequisites

12cp in GEOS units at 300 level

Corequisites

Co-badged status

Unit description

This is an advanced field-based unit with a strong emphasis on the observation and delineation of rock units using a range of different mapping techniques. The concepts of depositional environments, rock succession, rock deformation and geological histories will be enhanced during small-group tutorials. An initial report will include critical analysis of the literature covering depositional environment and provenance. A final report will include a discussion on the tectonic evolution of the area covered by the field mapping.

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:

Developed skills in inference of depositional environments from field observations.

Developed advanced skills in rock and fossil identification.

Developed skills in using and interpreting air photos for location, geomorphic and geological purposes

Developed advanced field skills including conglomerate clast analysis, stereographic projections and heavy mineral panning techniques.

Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

General Assessment Information

Written Reports (Assignment 1 and Assignment 2)

* *These two Assignments are to be submitted electronically (via Turnitin).* Students must keep a copy of their reports.

Late submission: No extensions will be granted. There will be a deduction of 5% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 10% penalty). This penalty does not apply for cases in which an application for disruption of studies is made and approved.

Presentation of written reports

The Outline:

1. Introduction. Define terms and outline your approach to the topic.
2. Discussion. This section is for explanation and discussion of the topic. It may help to write down a list of major points that will become your paragraphs, so that you can arrange your notes under each point.
3. Conclusion. This is not a reiteration of the discussion, but a summary statement that rounds off the report.

The Dangers of Plagiarism and how to avoid it

The integrity of learning and scholarship depends on a code of conduct governing good practice and acceptable academic behaviour. One of the most important elements of good practice involves acknowledging carefully the people whose ideas we have used, borrowed, or developed. All students and scholars are bound by these rules because all scholarly work depends in one way or another on the work of others.

Therefore, there is nothing wrong in using the work of others as a basis for your own work, nor is it evidence of inadequacy on your part, provided you do not attempt to pass off someone else's work as your own.

To maintain good academic practice, so that you may be given credit for your own efforts, and so

that your own contribution can be properly appreciated and evaluated, you should acknowledge your sources and you should **always**:

1. State clearly in the appropriate form where you found the material on which you have based your work.
2. Acknowledge the people whose concepts, experiments, or results you have extracted, developed, or summarised, even if you put these ideas into your own words.
3. Avoid excessive copying of passages by another author, even where the source is acknowledged. Find another form of words to show that you have thought about the material and understood it, but remember to state clearly where you found the ideas.

If you take and use the work of another person without clearly stating or acknowledging your source, you are falsely claiming that material as your own work and committing an act of PLAGIARISM. This is a very serious violation of good practice and an offence for which you will be penalised.

Field reports, maps and exercises

Maps and exercises to be handed in the field - no later than midnight December 7, 2017.

Field reports to be submitted electronically in the field using USB drive - no later than midnight December 7, 2017.

Late submission: No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for disruption of studies is made and approved.

Quizzes

Two compulsory quizzes will be done online on iLearn before the trip - no later than midnight December 1, 2017.

Late submission: No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for disruption of studies is made and approved.

Desired Standards:

Grade	Standard Required
High Distinction	Demonstrates an extensive knowledge and understanding of the concepts of the unit.

Distinction	Demonstrates a thorough knowledge and understanding of the concepts of the unit.
Credit	Demonstrates a sound knowledge and understanding of the concepts of the unit.
Pass	Demonstrates a basic knowledge and understanding of the concepts of the unit.
Fail	Demonstrates a poor knowledge and understanding of the concepts of the unit.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Two on-line quizzes</u>	5%	No	01/12/2017
<u>Assignment 1</u>	10%	No	01/12/2017
<u>Field reports and exercises</u>	25%	No	07/12/2017
<u>Participation mark</u>	10%	No	08/12/2017
<u>Class test</u>	40%	No	7/12/2017
<u>Assignment 2</u>	10%	No	20/12/2017

Two on-line quizzes

Due: **01/12/2017**

Weighting: **5%**

Two compulsory iLearn online quizzes will be done by you in your own time, prior to the field camp. These will open in the end of November 2017, and MUST be completed by 1st of December 2017 midnight (Friday), the night before our departure on the field camp. These two quizzes are together worth 5% of your GEOS811 unit, and cover (1) field safety and what to bring on the field camp, and (2) the basics of rock identification. The quizzes will be done open-book. You have 1 hour to complete the field safety quiz, 2 hours to complete the basics of rock identification quiz. All the information you need to know in order to score full marks on the quizzes can be found in the GEOS811 unit handout file. Please read the contents of this file carefully before the fieldwork, and before attempting the quizzes.

On successful completion you will be able to:

- Developed advanced skills in rock and fossil identification.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assignment 1

Due: **01/12/2017**

Weighting: **10%**

Assignment 1 is on “***Conglomerate depositional environment and clast provenance***” and is to be completed by 1st of December 2017, prior to the field camp.

Details about this assignment will be released separately through iLearn.

On successful completion you will be able to:

- Developed skills in inference of depositional environments from field observations.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Field reports and exercises

Due: **07/12/2017**

Weighting: **25%**

Field reports to be handed in (worth 25%):

1. Individual report on depositional environment, including section on fossils (10%).
2. Report on conglomerate clast composition and orientation of the clasts, and the inferences about source provenance and depositional environment of the conglomerate (individual) (10%).
3. Identification of minerals in heavy-mineral concentrates panned in the field (individual) (5%).

Field maps and exercises need to be submitted and are graded as complete or incomplete:

1. Aerial photo interpretation of selected area (individual).
2. Field map and notes (group).
3. Sedimentary log (group).
4. Orientation of clasts using stereonet (group).
5. Identifications of minerals under binocular microscope (individual).

On successful completion you will be able to:

- Developed skills in inference of depositional environments from field observations.

- Developed advanced skills in rock and fossil identification.
- Developed skills in using and interpreting air photos for location, geomorphic and geological purposes
- Developed advanced field skills including conglomerate clast analysis, stereographic projections and heavy mineral panning techniques.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Participation mark

Due: **08/12/2017**

Weighting: **10%**

Each student will be awarded a mark for their performance. Consideration will be given to your reliability as a member of a team and your contribution to team discussions and activities, both in the field and during the evening work. Particular attention will be given to members of the teams who show initiative, creative problem-solving strategies and who diligently complete the tasks.

On successful completion you will be able to:

- Developed skills in inference of depositional environments from field observations.
- Developed advanced skills in rock and fossil identification.
- Developed skills in using and interpreting air photos for location, geomorphic and geological purposes
- Developed advanced field skills including conglomerate clast analysis, stereographic projections and heavy mineral panning techniques.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Class test

Due: **7/12/2017**

Weighting: **40%**

The final class test will cover skills and knowledge gained in the field and during evening activities. The class test will be for 2 hours.

On successful completion you will be able to:

- Developed skills in inference of depositional environments from field observations.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assignment 2

Due: **20/12/2017**

Weighting: **10%**

Assignment 2 is on “Placing the Lake Keepit area into a regional plate tectonic context” and is to be completed by 20th of December 2017, after the fieldcamp. Details about this assignment will be released separately through iLearn.

On successful completion you will be able to:

- Developed skills in inference of depositional environments from field observations.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Delivery and Resources

GEOS811 is a field-based unit with a strong emphasis on the observation and delineation of rock units using a range of different mapping techniques. The concepts of depositional environments, rock succession, rock deformation and geological histories will be enhanced during small-group tutorials. This mapping will reveal past environments and show how these environments changed through time. This will involve the study of both natural outcrops and coloured air photographs of the region. An initial report will include research on conglomerate depositional environment and clast provenance. A final report will include a discussion of the tectonic evolution of the area covered by the field mapping (placing the Lake Keepit area into a regional plate tectonic context), and will be posted on iLearn after the field camp.

Set Textbook and Background Reading

Text books:

1. “**Structural Analysis and Synthesis A Laboratory Course in Structural Geology**” by [Stephen M. Rowland, Ernest M. Duebendorfer, Ilsa M. Schiefelbein, 3rd Edition, 2007.](#)
2. “**Sedimentology and stratigraphy**” by Gary **Nichols**. – 2nd Edition, 2009. ISBN 978-1-4051-3592-4

Journal papers:

- Russell, T. 1980. Use of clast shape in determining the sedimentary history of the late Devonian Keepit conglomerate, Australia. [Sedimentary Geology 25](#), 277-290.
- Nemec, W, Steel, R.J. 1984. Alluvial and coastal conglomerates: their significant features and some comments on gravelly mass-flow deposits. In: Koster EH, Steel RJ (eds) Sedimentology of gravels and conglomerates. [Canadian Society of Petroleum Geologists Memoir 10](#), 1–31.

*** Book chapters and papers will be available on iLearn**

- You will need to be able to access books and journal papers in the library
- You will be exposed to a variety of materials and concepts during the course
- You will use computers to complete your field reports
- You will use binocular microscope to identify minerals collected in the field

Unit Schedule

GEOS811: SCHEDULE OF EVENTS AT LAKE KEEPIT

Day	Daylight	Evening
Saturday	Drive to Keepit. Buses will stop at Singleton for a short break and at Tamworth for lunch and supplies.	Welcome and an introduction to the unit. Field survival: water, hats, sunscreen. Short lecture on Sediments and Sedimentary rocks. Hand out materials. Air photo exercise. Hand-in individual aerial photo interpretation.
Sunday	Walk through N section of Keepit area. Defining units, strike/dip orientations.	Short lecture on palaeo (fossils). Conversion of magnetic to true north. Draw up sedimentary log as a group. Start group maps. Hand-in sedimentary log (group). Talks.
Monday	Induction to access property for mapping. Mapping units defined on Sunday. Fabric analysis of conglomerates in the first location near dam wall.	Short lecture on igneous rock classification. Finalising group maps. Start aerial photo interpretation to infer the position of the conglomerate unit away from the area that you have visited (group). Talks.
Tuesday	Finalising mapping. Fabric analysis of conglomerates in the second location. Heavy-mineral sampling (dry creek).	Short lecture on Paleo-environments. Plot orientation of clasts using stereonet (group). Commence individual report on conglomerate clast composition and orientation of the clasts, and the inferences about source provenance and depositional environment of the conglomerate. Talks.

Wednesday	Heavy-mineral sampling and panning exercise.	Short lecture on cross sections and geological histories. Plot orientation of clasts using stereonet (group). Hand-in orientation of clasts using stereonet. Talks.
Thursday	Finalising mapping. Finish by 12 noon.	Hand in maps and completed individual report on conglomerates. Hand in equipment. Class test. Check all equipment is in. Relax.
Friday	Clean up camp; drive home. Buses will stop at Singleton for lunch.	

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

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

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/

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

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

- Developed skills in inference of depositional environments from field observations.
- Developed advanced skills in rock and fossil identification.
- Developed skills in using and interpreting air photos for location, geomorphic and geological purposes
- Developed advanced field skills including conglomerate clast analysis, stereographic

projections and heavy mineral panning techniques.

Assessment tasks

- Two on-line quizzes
- Assignment 1
- Field reports and exercises
- Participation mark
- Class test
- Assignment 2

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

- Developed skills in inference of depositional environments from field observations.
- Developed advanced skills in rock and fossil identification.
- Developed skills in using and interpreting air photos for location, geomorphic and geological purposes
- Developed advanced field skills including conglomerate clast analysis, stereographic projections and heavy mineral panning techniques.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assessment tasks

- Two on-line quizzes
- Assignment 1
- Field reports and exercises
- Class test
- Assignment 2

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

- Developed skills in inference of depositional environments from field observations.
- Developed advanced field skills including conglomerate clast analysis, stereographic projections and heavy mineral panning techniques.
- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assessment tasks

- Assignment 1
- Field reports and exercises
- Class test
- Assignment 2

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

- Enhanced generic skills such as team work, organisational, problem solving and public speaking skills.

Assessment tasks

- Assignment 1
- Field reports and exercises
- Participation mark
- Class test
- Assignment 2