



GEOS345

Data and Image Processing in Geophysics and Exploration

S2 Day 2014

Earth and Planetary Sciences

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General Information

Unit convenor and teaching staff Unit Convenor Mark Lackie mark.lackie@mq.edu.au Contact via mark.lackie@mq.edu.au
Credit points 3
Prerequisites GEOS305
Corequisites
Co-badged status
Unit description This applied unit aims to provide familiarity with a variety of geophysical computer software packages that are currently being utilised by exploration companies. Students will learn to analyse and interpret different geophysical datasets.

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:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information
- Capacity to present ideas clearly with supporting evidence

Assessment Tasks

Name	Weighting	Due
<u>Assignment I</u>	15%	Week 3
<u>Assignment II</u>	15%	Week 5
<u>Assignment III</u>	15%	Week 7
<u>Assignment IV</u>	10%	Week 9
<u>Assignment V</u>	10%	Week 11
<u>Assignment VI</u>	15%	Week 13
<u>Exam</u>	15%	Week 14
<u>Oral Presentation</u>	5%	week 13

Assignment I

Due: **Week 3**

Weighting: **15%**

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On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
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- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Capacity to present ideas clearly with supporting evidence

Assignment II

Due: **Week 5**

Weighting: **15%**

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On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Competence in accessing, using and synthesising appropriate information

Assignment III

Due: **Week 7**

Weighting: **15%**

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On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Competence in accessing, using and synthesising appropriate information
- Capacity to present ideas clearly with supporting evidence

Assignment IV

Due: **Week 9**

Weighting: **10%**

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On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Competence in accessing, using and synthesising appropriate information

Assignment V

Due: **Week 11**

Weighting: **10%**

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On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information
- Capacity to present ideas clearly with supporting evidence

Assignment VI

Due: **Week 13**

Weighting: **15%**

-

On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information
- Capacity to present ideas clearly with supporting evidence

Exam

Due: **Week 14**

Weighting: **15%**

Practical Exam

On successful completion you will be able to:

- Understanding of the basic concepts of geophysics
- Understanding scientific methodology
- Application of knowledge to solving problems and evaluating ideas and information
- Capacity to present ideas clearly with supporting evidence

Oral Presentation

Due: **week 13**

Weighting: **5%**

Give an oral presentation on a selected topic

On successful completion you will be able to:

- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Capacity to present ideas clearly with supporting evidence

Delivery and Resources

Required and Recommended Texts and/or Materials

There is no textbook for the unit. A copy of SHARMA (QE501.3.S48), or PARASNIS (TN269P32) or TELFORD (TN269.T44) or KEAREY and BROOKS (TN269.K36) or MUSSETT and KHAN (QE501.M87) would be useful to have around.

Technology Used and Required

Copies of relevant sections of the software manuals are on all the computers and I will make them available on the iLearn WEBSITE at <https://ilearn.mq.edu.au/login/MQ/>. I will post the assignments and PDFs of relevant sections of the manuals on that site.

Unit Schedule

WEEK	TOPIC
Week 1	Introduction to DOS and MODELVISION
Week 2	MODELVISION
Week 3	MODELVISION and MAPINFO/DISCOVER
Week 4	MAPINFO/DISCOVER
Week 5	MAPINFO/DISCOVER
Week 6	GEOSOFT
Week 7	GEOSOFT
Mid Semester Break	Mid Semester Break
Week 8	PROFILE ANALYST
Week 9	PROFILE ANALYST
Week 10	ERMAPPER
Week 11	ERMAPPER and ASSIGNMENT VI
Week 12	ASSIGNMENT VI
Week 13	ASSIGNMENT VI
Week 14	EXAM

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.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

Disruption to Studies Policy 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/

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://informatics.mq.edu.au/hel>

p/.

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

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

- Gaining computational skills
- Competence in accessing, using and synthesising appropriate information

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

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information
- Capacity to present ideas clearly with supporting evidence

Assessment tasks

- Assignment I
- Assignment II
- Assignment III
- Assignment IV

- Assignment V
- Assignment VI
- Oral Presentation

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

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Gaining computational skills
- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information
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Assessment tasks

- Assignment I
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- Assignment III
- Assignment IV
- Assignment V
- Assignment VI
- Exam
- Oral Presentation

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

- Understanding scientific methodology
- Application of knowledge to solving problems and evaluating ideas and information

Assessment task

- Assignment VI

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

- Understanding scientific methodology
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information

Assessment tasks

- Assignment VI
- Exam
- Oral Presentation

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

- Understanding of the basic concepts of geophysics
- Gaining experience in utilising geophysical software
- Competence in accessing, using and synthesising appropriate information
- Application of knowledge to solving problems and evaluating ideas and information

- Capacity to present ideas clearly with supporting evidence

Assessment tasks

- Assignment I
- Assignment II
- Assignment III
- Assignment IV
- Assignment V
- Assignment VI
- Exam
- Oral Presentation