Unit Outline
313926 Applied Geophysics 511
Semester 1, 2013

Unit study package number: 313926
Mode of study: Fully Online
Tuition pattern summary: This unit does not have a fieldwork component.
Credit Value: 25.0
Pre-requisite units: 308919 (v.1) WASM Geological Concepts 511
OR
308919 (v.2) Geological Concepts 511
AND
308920 (v.1) WASM Resource Geology 511
OR
308920 (v.2) Resource Geology 511

Co-requisite units: Nil
Anti-requisite units: Nil
Result type: Grade/Mark
Approved incidental fees: Information about approved incidental fees can be obtained from our website. Visit fees.curtin.edu.au/incidental_fees.cfm for details.

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Room: 4G05
Consultation times: By prior appointment

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Learning Management System: Blackboard (lms.curtin.edu.au)
Acknowledgement of Country
We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present.

Syllabus
Geophysics is used to investigate the physical properties of the ground directly beneath the earth's surface. Techniques to be covered include gravity, magnetic, electromagnetic, electrical, radiometric and seismic surveys. Each of these methods provides unique information regarding subsurface geology and the potential for mineral deposits as well as having limitations. Online delivery.

Introduction
Welcome to the Applied Geophysics 511 unit.
This unit provides an introduction to geophysics, which is the main technique used to investigate the physical nature of the ground directly beneath the Earth's surface and consequently is a valuable tool for the non-invasive exploration of the Earth's sub-surface. Study topics cover the geophysical techniques applicable to mineral exploration and tutorials provide exercises on typical geophysics data analysis and interpretation.

Learning Outcomes
On successful completion of this unit students can:

<table>
<thead>
<tr>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Explain the use and limitation of gravity, magnetic, radiometric, seismic, electrical, electromagnetic and borehole methods used in geophysical mineral exploration</td>
</tr>
<tr>
<td>2 Describe and apply geophysical data processing, databases, filters and image techniques used in geophysical mineral exploration</td>
</tr>
<tr>
<td>3 Analyse and interpret simple datasets from gravity, magnetic, radiometric, seismic, electrical and electromagnetic geophysical exploration methods</td>
</tr>
</tbody>
</table>

Curtin’s Graduate Attributes

| Thinking skills (use analytical skills to solve problems) | Information skills (confidence to investigate new ideas) |
| Communication skills | Technology skills |
| International perspective (value the perspectives of others) | Cultural understanding (value the perspectives of others) |
| Professional Skills (work independently and as a team) (plan own work) |

Find out more about Curtin’s Graduate attributes at the Office of Teaching & Learning website: otl.curtin.edu.au

Learning Activities
Weekly topics cover theory and application aspects of the different geophysical methods applicable to mineral exploration. Tutorials on the relevant topic are provided for students to work through and complete each week. Completion of these tutorials is necessary for completion of the assignments.

The topic and tutorial schedule is provided at the end of this unit outline.

It is expected that a student would need to complete 11 hours of combined study/tutorial/assignment time per week.
Learning Resources

Essential Texts
The required textbook(s) for this unit are:


Recommended Texts
You do not have to purchase the following textbooks but you may like to refer to them.


Other Resources
Additional study and reference material will be made available via Blackboard and the Library e-Reserve system. The geophysical processing and analysis software that is required for tutorials and assignments will be made available to students during the semester via remote login to a virtual machine hosted on a University server. Access details will be provided in the tutorial information at the start of the semester.

Assessment

Assessment Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Value %</th>
<th>Date Due</th>
<th>Unit Learning Outcome(s) Assessed</th>
</tr>
</thead>
</table>
| Assignment One Gravity magnetics and radiometrics | 25 percent | Week: Week 4 Monday:-Part A and Week 7 Monday:-Part B  
Time: 20:00 | 1,2,3 |
| Assignment Two Seismics | 15 percent | Week: Week 10  
Day: Monday  
Time: 20:00 | 2,3 |
| Assignment Three Electrical and Electromagnetics | 10 percent | Week: Week 13  
Day: Monday  
Time: 20:00 | 2,3 |
| End of semester exam | 50 percent | Week: Examination period | 1,2,3 |
Detailed information on assessment tasks

1. Gravity, magnetic and radiometric data will be processed and interpreted, and additional questions on these topics will be answered. Part A assesses gravity (10% value) and Part B assesses magnetics and radiometrics (15% value). This assignment is split into two parts so as to provide marks and feedback on a portion of the work as early as possible in the semester.

2. Seismic refraction and reflection data will be processed and interpreted, and additional questions on these topics will be answered.

3. Electrical and electromagnetic data will be processed and interpreted, and additional questions on these topics will be answered.

4. The end of semester examination will be an invigilated 2 hour closed book exam consisting of a combination of multiple choice questions and longer multi-part questions that require written answers. Further details and example questions will be provided during the semester. Central Examinations will contact students during the semester via the Official Communications Channel (OCC) with details of the location, time and other aspects of the invigilated examination.

Fair assessment through moderation

Moderation describes a quality assurance process to ensure that assessments are appropriate to the learning outcomes, and that student work is evaluated consistently by assessors. Minimum standards for the moderation of assessment are described in the Assessment Manual, available from policies.curtin.edu.au/policies/teachingandlearning.cfm

Late Assessment Policy

This ensures that the requirements for submission of assignments and other work to be assessed are fair, transparent, equitable, and that penalties are consistently applied.

1. All assessments which students are required to submit will have a due date and time specified on the Unit Outline.
2. Accepting late submission of assignments or other work will be determined by the unit coordinator or Head of School and will be specified on the Unit Outline.
3. If late submission of assignments or other work is not accepted, students will receive a penalty of 100% after the due date and time ie a zero mark for the late assessment.
4. If late submission of assignments or other work is accepted, students will be penalised by ten percent per calendar day for a late assessment submission (eg a mark equivalent to 10% of the total allocated for the assessment will be deducted from the marked value for every day that the assessment is late). This means that an assignment worth 20 will have two marks deducted per calendar day late. Hence if it was handed in three calendar days late and marked as 12/20, the student would receive 6/20. An assessment more than seven calendar days overdue will not be marked. Work submitted after this time (due date plus seven days) may result in a Fail - Incomplete (F-IN) grade being awarded for the unit.

Pass requirements

Submission of ALL assessments (i.e. assignments) is COMPULSORY. Non-compliance will result in failure.

An overall mark of 50% is required to pass the unit.

Referencing style

Students should use the Society of Exploration Geophysicists (SEG) referencing style when preparing assignments. More information on this referencing style can be obtained at http://www.seg.org/resources/publications/books/bookinstructionstoauthors

Plagiarism

Plagiarism occurs when work or property of another person is presented as one's own, without appropriate acknowledgement or referencing. Plagiarism is a serious offence. For more information refer to academicintegrity.curtin.edu.au.
Plagiarism Monitoring

Work submitted may be subjected to a plagiarism detection process, which may include the use of systems such as 'Turnitin'. For further information, see academicintegrity.curtin.edu.au/students/turnitin.cfm.

Additional information

Submission of assignments:

Assignments must be the student's own independent work: if any work or information is used that is not the student's then it must be properly acknowledged and referenced. Students must also read the plagiarism sections elsewhere in this unit outline and adhere to the university policy on plagiarism.

Assignments are to be submitted via the relevant assignment upload area in Blackboard as a PDF document.

Instructions will be given during the semester as to the required format of the assignment submission and how to minimise uploading problems. However, students should read the information on submitting assignments and reducing file sizes that is provided under the 'Student' tab on their Blackboard site.

Marked assignments will be returned to students, as a PDF document, together with marks and feedback via their 'My Grades' area in Blackboard.

Students should allow a 2 to 3 week marking turnaround for written assignments.

Penalties apply for the late submission of assessments (i.e. assignments) unless prior arrangements have been made with the unit coordinator. Read the section on Late Assessment Policy elsewhere in this unit outline.

Geophysical processing software:

Specialist geophysical processing software is used for some of the tutorial and assignment work during the semester. Student access to this software is achieved by remote login to virtual machines (VMs) hosted on a University server. This necessitates the need for student's to have Internet access at some stages of the tutorial and assignment completion process. Login details will be provided in the tutorial information at the start of the semester.

Enrolment:

It is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, where you can also print an Enrolment Advice.

Supplementary/Deferred Exams:

Supplementary and deferred examinations will be held at a date to be advised. Notification to students will be made after the Board of Examiners meeting via the Official Communications Channel (OCC) in OASIS. It is the student's responsibility to check their OASIS account on a weekly basis for official Curtin correspondence. If your results show that you have been awarded a supplementary or deferred exam you should immediately check your OASIS email for details.

Supplementary/Deferred examinations will be held, if necessary, only during the dates 18th - 19th July.

Following the Board of Examiner's Meeting, held 8th July, students who have been awarded a Supplementary Examination will be advised accordingly. Students can contact the Department on 9266-3565 for confirmation and further information about the arrangements.

Student Rights and Responsibilities

It is the responsibility of every student to be aware of all relevant legislation, policies and procedures relating to their rights and responsibilities as a student. These include:

- the Student Charter
- the University's Guiding Ethical Principles
- the University's policy and statements on plagiarism and academic integrity
- copyright principles and responsibilities
- the University's policies on appropriate use of software and computer facilities

Information on all these things is available through the University's "Student Rights and Responsibilities website at: students.curtin.edu.au/rights."
Disability

Students with a disability or medical condition (e.g. mental health condition, chronic illness, physical or sensory disability, learning disability) are encouraged to seek advice from Disability Services [www.disability.curtin.edu.au](http://www.disability.curtin.edu.au). A Disability Advisor will work with you and liaise with staff to identify strategies to assist you to meet unit (including fieldwork education) and course requirements, where possible. It is important to note that the staff of the university may not be able to meet your needs if they are not informed of your individual circumstances.

Recent unit changes

We welcome feedback as one way to keep improving this unit. Students are encouraged to provide unit feedback through eVALUate, Curtin's online student feedback system (see [evaluate.curtin.edu.au/info](http://evaluate.curtin.edu.au/info)). Recent changes to this unit include:

The format of some study materials has been changed in response to student eVALUate comments.

See [evaluate.curtin.edu.au](http://evaluate.curtin.edu.au) to find out when you can eVALUate this unit.
Program calendar
<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Topic</th>
<th>Pre-readings</th>
<th>Tutorial</th>
<th>Assessment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>25 February</td>
<td>Introduction to geophysics and geophysical methods</td>
<td>Mussett &amp; Khan: Chapters 1, 2, 3, 19 &amp; 23</td>
<td>Geophysical properties and Oasis montaj tutorial</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>4 March</td>
<td>Gravity</td>
<td>Mussett &amp; Khan: Chapter 8</td>
<td>Gravity</td>
<td></td>
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<tr>
<td>2.</td>
<td>11 March</td>
<td>Magnetics</td>
<td>Mussett &amp; Khan: Chapters 10 &amp; 11</td>
<td>Magnetics</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>18 March</td>
<td>Geophysical processing</td>
<td>Mussett &amp; Khan: Chapters 2, 3, 8 &amp; 11</td>
<td>Geophysical processing: Gravity and magnetics</td>
<td>Assignment 1 Part-A: Gravity Monday 25 March</td>
</tr>
<tr>
<td>4.</td>
<td>25 March</td>
<td>Radiometrics</td>
<td>Mussett &amp; Khan: Chapter 16</td>
<td>Radiometrics</td>
<td></td>
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<tr>
<td>5.</td>
<td>1 April</td>
<td>Seismic waves &amp; seismic refraction method</td>
<td>Mussett &amp; Khan: Chapters 4 &amp; 6</td>
<td>Seismic waves and refraction</td>
<td></td>
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<tr>
<td>6.</td>
<td>8 April</td>
<td>Seismic reflection method</td>
<td>Mussett &amp; Khan: Chapters 4 &amp; 7</td>
<td>Seismic reflection</td>
<td>Assignment 1 Part-B: Magnetics and Radiometrics Monday 15 April</td>
</tr>
<tr>
<td>7.</td>
<td>15 April</td>
<td>Borehole geophysics</td>
<td>Mussett &amp; Khan: Chapter 18</td>
<td>Borehole geophysics</td>
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<td>8.</td>
<td>22 April</td>
<td>Self review of Topics 1 to 7</td>
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<tr>
<td>9.</td>
<td>29 April</td>
<td>Electrical properties of rocks</td>
<td>Mussett &amp; Khan: Chapters 12 &amp; 13</td>
<td>Electrical properties of rocks</td>
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<tr>
<td>10.</td>
<td>6 May</td>
<td>Electrical and resistivity methods</td>
<td>Mussett &amp; Khan: Chapters 12 &amp; 13</td>
<td>Electrical resistivity</td>
<td>Assignment 2 Seisms Monday 6 May</td>
</tr>
<tr>
<td>11.</td>
<td>13 May</td>
<td>Electromagnetics and electromagnetic methods: FDEM and TEM</td>
<td>Mussett &amp; Khan: Chapter 14</td>
<td>Electromagnetics (TEM decay curves)</td>
<td></td>
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<tr>
<td>12.</td>
<td>20 May</td>
<td>Electromagnetic methods: MT and VLF</td>
<td>Mussett &amp; Khan: Chapter 14</td>
<td>Electromagnetics (AEM grids)</td>
<td></td>
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<tr>
<td>13.</td>
<td>27 May</td>
<td>Electromagnetic methods: GPR</td>
<td>Mussett &amp; Khan: Chapter 14</td>
<td>Electromagnetics (GPR)</td>
<td>Assignment 3 Electrical and Electromagnetics Monday 27 May</td>
</tr>
<tr>
<td>14.</td>
<td>3 June</td>
<td>Borehole geophysics</td>
<td>Mussett &amp; Khan: Chapter 18</td>
<td>Borehole geophysics</td>
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<td>15.</td>
<td>10 June</td>
<td>Study Week</td>
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<td>16.</td>
<td>17 June</td>
<td>Examinations</td>
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<tr>
<td>17.</td>
<td>24 June</td>
<td>Examinations</td>
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