Unit Outline

11914 Introduction to Geophysical Oil and Gas Exploration Methods 246
Semester 1, 2013

Unit study package number: 11914
Mode of study: Internal
Tuition pattern summary: Fieldwork: 1 x 2 Hours Once-only
Computer Laboratory: 1 x 2 Hours Once-only
Lecture: 1 x 2 Hours Weekly
This unit contains a fieldwork component. Find out more at the fieldwork education website: (fieldworkeducation.curtin.edu.au)

Credit Value: 12.5
Pre-requisite units: 7031 (v.0) Geology 101 or any previous version
AND
7032 (v.0) Geology 102 or any previous version
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.

Unit coordinator:
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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

Introduction
Welcome to Introduction to Geophysical Oil and Gas Exploration Methods 246. This unit is designed to provide the student with a basic knowledge of the methods of seismic geophysics and their application to oil and gas exploration as well as relevant electromagnetic and well logging techniques.

Learning Outcomes

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Analyse geophysical data from a basic seismic survey</td>
<td>✅ ✅</td>
</tr>
<tr>
<td>2 Explain the use of well-log measurements in geophysical exploration</td>
<td>✅</td>
</tr>
<tr>
<td>3 Relate rock properties to seismic characteristics</td>
<td>✅</td>
</tr>
<tr>
<td>4 Analyse petroleum geology problems and select appropriate geophysical techniques to address them</td>
<td>✅</td>
</tr>
<tr>
<td>5 Perform basic interpretation of seismic reflection data</td>
<td>✅</td>
</tr>
</tbody>
</table>

Curtin's Graduate Attributes

- Apply discipline knowledge
- Thinking skills (use analytical skills to solve problems)
- Information skills (confidence to investigate new ideas)
- Communication skills
- Technology skills
- Learning how to learn (apply principles learnt to new situations) (confidence to tackle unfamiliar problems)
- 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
Lectures explain theory and application aspects of the different geophysical methods applicable to oil and gas exploration.
The lecture schedule is provided at the end of this unit outline.
In addition to the 2 hours of lecture per week, it is expected that a student would need to complete an additional 3 hours of associated study/work 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
Apart from the specified text books, additional teaching material will be made available online through Blackboard and eReserve.

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>
| 1  Seismic refraction exercise | 20 percent | Week: Week 4  
                                        Day: Thursday  
                                        Time: 20:00 | 1,3                                |
| 2  Seismic reflection exercise | 20 percent | Week: Week 9  
                                        Day: Monday  
                                        Time: 20:00 | 1,3,5                              |
| 3  Well-log exercise         | 10 percent | Week: Week 12  
                                        Day: Monday  
                                        Time: 20:00 | 2,3,4                              |
| 4  End of semester examination | 50 percent | Week: Examination period | 1,2,3,4,5                          |

Detailed information on assessment tasks

1. Seismic refraction survey data will be analysed and an interpretation will be made of the associated geological section (indicating layer velocities, depths, dips and rock types); and seismic wave and rock properties will be related to geophysical characteristics. The submitted assignment will answer the questions asked in the assignment worksheet.

2. Seismic reflection data will be analysed and interpreted to estimate seismic velocity, acoustic impedance, reflection coefficient and depth of target horizon(s). The submitted assignment will answer the questions asked in the assignment worksheet.

3. Well log methods will be explained and data will be analysed and interpreted. The submitted assignment will answer questions about the relevant well logging theory and make interpretations of the supplied data that has relevance for reservoir characterisation.

4. The final exam will be a 2 hour closed book examination that consists of multiple choice and short answer/essay questions. Further details and example questions will be provided during the semester.

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 i.e. 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 (e.g. 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.

Practical sessions:
There will be questions in the assignments based on the work done in the practical sessions, and there may or may not be questions about these sessions in the End of Semester Examination.

Although practical sessions are conducted in groups, work submitted for assessment must the student's own independent work (see note above).

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 Examiners 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](https://evaluate.curtin.edu.au), Curtin’s online student feedback system (see [evaluate.curtin.edu.au/info](http://evaluate.curtin.edu.au/info)). Recent changes to this unit include:

In line with the University initiative to introduce a ‘flipped classroom’ approach and in response to requests by students for hands-on experience of geophysical equipment and software, two of the lectures this semester will be ‘flipped’ and replaced with practical-based sessions. These sessions are indicated in the Calendar at the end of this Unit Outline; further details about the sessions will be given during the semester. The relevant theory for the practical sessions will be provided for students to study beforehand.

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>Lecture/Workshop</th>
<th>Pre-readings</th>
<th>Assessment Due</th>
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</thead>
<tbody>
<tr>
<td>Orientation</td>
<td></td>
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</tr>
<tr>
<td>1.</td>
<td>4 March</td>
<td>Introduction to oil &amp; gas exploration geophysics</td>
<td>Mussett &amp; Khan: Chapters 1, 2, 3, 8 &amp; 11</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>11 March</td>
<td>Seismic waves and seismic refraction method</td>
<td>Mussett &amp; Khan: Chapters 4 and 6</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>18 March</td>
<td>Seismic refraction surveying and interpretation (practical session: field workshop)</td>
<td>Mussett &amp; Khan: Chapter 6</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>25 March</td>
<td>Seismic reflection method</td>
<td>Mussett &amp; Khan: Chapters 4 and 7</td>
<td>Assignment 1 Thursday 28 March</td>
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<tr>
<td>5.</td>
<td>1 April</td>
<td>Tuition Free Week</td>
<td></td>
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<tr>
<td>6.</td>
<td>8 April</td>
<td>Seismic reflection processing</td>
<td>Mussett &amp; Khan: Chapter 7</td>
<td></td>
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<tr>
<td>7.</td>
<td>15 April</td>
<td>Seismic reflection interpretation (practical session: computer software workshop)</td>
<td>Mussett &amp; Khan: Chapter 7</td>
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<td>8.</td>
<td>22 April</td>
<td>Tuition Free Week</td>
<td></td>
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<tr>
<td>9.</td>
<td>29 April</td>
<td>Well logging methods</td>
<td>Mussett &amp; Khan: Chapter 18</td>
<td>Assignment 2 Monday 29 April</td>
</tr>
<tr>
<td>10.</td>
<td>6 May</td>
<td>Well logging interpretation</td>
<td>Mussett &amp; Khan: Chapter 18</td>
<td></td>
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<tr>
<td>11.</td>
<td>13 May</td>
<td>Electromagnetics</td>
<td>Mussett &amp; Khan: Chapter 14</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>20 May</td>
<td>Sea floor electromagnetic surveying</td>
<td>Mussett &amp; Khan: Chapter 14</td>
<td>Assignment 3 Monday 20 May</td>
</tr>
<tr>
<td>13.</td>
<td>27 May</td>
<td>Geophysical Oil &amp; Gas exploration</td>
<td>All above</td>
<td></td>
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<tr>
<td>14</td>
<td>3 June</td>
<td>Revision</td>
<td>All above</td>
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<tr>
<td>15.</td>
<td>10 June</td>
<td>Study Week</td>
<td></td>
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<tr>
<td>16.</td>
<td>17 June</td>
<td>Examinations</td>
<td></td>
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<tr>
<td>17.</td>
<td>24 June</td>
<td>Examinations</td>
<td></td>
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