Unit Outline
GEOP3001 Introduction to Seismic Exploration
Semester 1, 2015

Unit study package code: GEOP3001
Mode of study: Internal
Tuition pattern summary: Note: For any specific variations to this tuition pattern and for precise information refer to the Learning Activities section.
Lecture: 1 x 2 Hours Weekly
Computer Laboratory: 1 x 3 Hours Weekly
This unit contains a fieldwork component. Find out more at the fieldwork education website: (fieldworkeducation.curtin.edu.au)
Credit Value: 25.0
Pre-requisite units:
7032 (v.0) Geology 102 or any previous version
OR
GEOL1006 (v.0) Fundamentals of Geology 2 or any previous version
AND
307727 (v.0) Propagation of Energy 201 or any previous version
OR
GEOP2002 (v.0) Propagation of Energy or any previous version
AND
8128 (v.0) Linear Algebra 202 or any previous version
OR
7905 (v.0) Mathematical Methods 202 or any previous version
OR
MATH2010 (v.0) Linear Algebra or any previous version
AND
8127 (v.0) Advanced Calculus 201 or any previous version
OR
8648 (v.0) Mathematical Methods 201 or any previous version
OR
MATH2009 (v.0) Advanced Calculus 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.
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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
Oil exploration geophysics. Seismic wave types and elastic theory. Refraction and reflection. Well logging. Field trips and laboratory exercises are designed to develop competence in acquisition, processing and interpretation of seismic and well log data.

Introduction
Welcome to Introduction to Seismic Exploration 303. The aim of this unit is to provide a fundamental understanding of the seismic exploration method and its application.

Unit Learning Outcomes
All graduates of Curtin University achieve a set of nine graduate attributes during their course of study. These tell an employer that, through your studies, you have acquired discipline knowledge and a range of other skills and attributes which employers say would be useful in a professional setting. Each unit in your course addresses the graduate attributes through a clearly identified set of learning outcomes. They form a vital part in the process referred to as assurance of learning. The learning outcomes tell you what you are expected to know, understand or be able to do in order to be successful in this unit. Each assessment for this unit is carefully designed to test your achievement of one or more of the unit learning outcomes. On successfully completing all of the assessments you will have achieved all of these learning outcomes.

Your course has been designed so that on graduating we can say you will have achieved all of Curtin's Graduate Attributes through the assurance of learning process in each unit.

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Describe typical seismic parameters for use in oil and gas exploration</td>
<td>📒</td>
</tr>
<tr>
<td>2 Recognise and analyse all of the common wave modes in seismic data</td>
<td>📒</td>
</tr>
<tr>
<td>3 Perform basic survey planning for refraction studies</td>
<td>📒</td>
</tr>
<tr>
<td>4 Explain the common processes of transforming field data into an interpretable form</td>
<td>📒</td>
</tr>
<tr>
<td>5 Perform basic interpretation of seismic reflection data and map geological forms in a grid</td>
<td>📒</td>
</tr>
</tbody>
</table>

Curtin’s Graduate Attributes

<table>
<thead>
<tr>
<th>Apply discipline knowledge</th>
<th>Thinking skills (use analytical skills to solve problems)</th>
<th>Information skills (confidence to investigate new ideas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication skills</td>
<td>Technology skills</td>
<td>Learning how to learn (apply principles learnt to new situations) (confidence to tackle unfamiliar problems)</td>
</tr>
<tr>
<td>International perspective (value the perspectives of others)</td>
<td>Cultural understanding (value the perspectives of others)</td>
<td>Professional Skills (work independently and as a team) (plan own work)</td>
</tr>
</tbody>
</table>

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

Learning Activities
Attending lectures and laboratories is fundamental. Laboratory work, experiments and exercises, as well as fieldwork (in the vicinity of the campus) under expert supervision, will be the main activity to familiarize the students with seismic equipment and techniques.
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
There is a prescribed book and also a list of recommended books in the the section above. However other material for deepening your knowledge of the subjects, and further reading and research material will be made available during the lectures and laboratories, or via Blackboard.
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>
<tbody>
<tr>
<td>1 Laboratory Books</td>
<td>20%</td>
<td>Week: 15, Day: 1, Time: 16:00</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>2 Assignment 1</td>
<td>15%</td>
<td>Week: 10, Day: 4, Time: 16:00</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>3 Assignment 2</td>
<td>15%</td>
<td>Week: 13, Day: 4, Time: 16:00</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>4 End of semester examination</td>
<td>50%</td>
<td>TBA</td>
<td>1, 2, 4</td>
</tr>
</tbody>
</table>

Detailed information on assessment tasks

1. Laboratory books should contain representation of each lab session with appropriate screenshots and comments. Size of portfolio is limited by 50 pages including (!) pictures.
2. The assignment will consist of several questions/exercises related to lecture material given in previous study weeks. Students are expected to produce written report with complete answers, including all intermediate computations and comments. Size of the report is limited by 3 (three) pages.
3. The assignment will consist of several questions/exercises related to lecture material given in previous study weeks. Students are expected to produce written report with complete answers, including all intermediate computations and comments. Size of the report is limited by 3 (three) pages.
4. Closed book examination

Pass requirements

- 50% or more of overall score
- Completed lab book submission
- Completion of assignments

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 and Student Progression 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 students are required to submit will have a due date and time specified on this Unit Outline.
2. Students will be penalised by a deduction of 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 assessment worth 20 marks will have two marks deducted per calendar day late. Hence if it was handed in three calendar days late and given a mark of 16/20, the student would receive 10/20. An assessment more than seven calendar days overdue will not be marked and will receive a mark of 0.

Assessment extension

A student unable to complete an assessment task by/on the original published date/time (eg examinations, tests) or due date/time (eg assignments) must apply for an assessment extension using the Assessment Extension form (available from students.curtin.edu.au/administration/) as prescribed by the Academic Registrar. It is the responsibility of the student to demonstrate
and provide evidence for exceptional circumstances beyond the student’s control that prevent them from completing/submitting the assessment task.

The student will be expected to lodge the form and supporting documentation with the unit coordinator before the assessment date/time or due date/time. An application may be accepted up to five working days after the date or due date of the assessment task where the student is able to provide an acceptable explanation as to why he or she was not able to submit the application prior to the assessment date. An application for an assessment extension will not be accepted after the date of the Board of Examiners’ meeting.

Deferred assessments
If your results show that you have been granted a deferred assessment you should immediately check your OASIS email for details. Deferred examinations/tests will be held from 16/07/2015 to 17/07/2015. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

Supplementary assessments
Supplementary assessments, if granted by the Board of Examiners, will have a due date or be held between 16/07/2015 and 17/07/2015. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

Deferred assessments
If your results show that you have been granted a deferred assessment you should immediately check your OASIS email for details. Deferred examinations/tests will be held from 16/07/2015 to 17/07/2015. Notification to students will be made after the Board of Examiners’ meeting via the Official Communications Channel (OCC) in OASIS.

It is the responsibility of students to be available to complete the requirements of a supplementary assessment. If your results show that you have been granted a supplementary assessment you should immediately check your OASIS email for details.

Referencing style
The referencing style for this unit is Chicago.

More information can be found on this style from the Library web site: library.curtin.edu.au.

Academic Integrity (including plagiarism and cheating)
Any conduct by a student that is dishonest or unfair in connection with any academic work is considered to be academic misconduct. Plagiarism and cheating are serious offences that will be investigated and may result in penalties such as reduced or zero grades, annulled units or even termination from the course.

Plagiarism occurs when work or property of another person is presented as one’s own, without appropriate acknowledgement or referencing. Submitting work which has been produced by someone else (e.g. allowing or contracting another person to do the work for which you claim authorship) is also plagiarism. Submitted work is subjected to a plagiarism detection process, which may include the use of text matching systems or interviews with students to determine authorship.

Cheating includes (but is not limited to) asking or paying someone to complete an assessment task for you or any use of unauthorised materials or assistance during an examination or test.

For more information, including student guidelines for avoiding plagiarism, refer to the Academic Integrity tab in Blackboard or academicintegrity.curtin.edu.au.

Additional information
If you have a query relating to administrative matters such as:

- requests for deferment of study
- difficulties with accessing online study materials
- obtaining assessment results

Please contact the Unit Coordinator or the Department Administrative Assistant.

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.
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.

Student Equity

There are a number of factors that might disadvantage some students from participating in their studies or assessments to the best of their ability, under standard conditions. These factors may include a disability or medical condition (e.g. mental illness, chronic illness, physical or sensory disability, learning disability), significant family responsibilities, pregnancy, religious practices, living in a remote location or another reason. If you believe you may be unfairly disadvantaged on these or other grounds please contact Student Equity at eesj@curtin.edu.au or go to http://eesj.curtin.edu.au/student_equity/index.cfm for more information.

You can also contact Counselling and Disability services: http://www.disability.curtin.edu.au or the Multi-faith services: http://life.curtin.edu.au/health-and-wellbeing/about_multifaith_services.htm for further information.

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 so please get in touch with the appropriate service if you require assistance. For general wellbeing concerns or advice please contact Curtin's Student Wellbeing Advisory Service at: http://life.curtin.edu.au/health-and-wellbeing/student_wellbeing_service.htm
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/).

Recent changes to this unit include:

Several laboratory sessions redesigned to match changes in seismic data processing software used in the unit.

To view previous student feedback about this unit, search for the Unit Summary Report at evaluate.curtin.edu.au/student/unit_search.cfm. See evaluate.curtin.edu.au to find out when you can eVALUate this unit.
# Program calendar

## Semester 1 2015 Lecture Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Lecture</th>
<th>Assessment</th>
<th>Assessment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>StartUp</td>
<td>22 February</td>
<td>Introduction, Seismic theory 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>01 March</td>
<td>Seismic theory 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>08 March</td>
<td>Rays and travel time curves</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>15 March</td>
<td>Basics of seismic signal processing</td>
<td></td>
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<tr>
<td>4.</td>
<td>22 March</td>
<td>Seismic equipment and field procedures</td>
<td></td>
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<tr>
<td>5.</td>
<td>29 March</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>05 April</td>
<td>Tuition Free Week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>12 April</td>
<td>Tuition Free Week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>19 April</td>
<td>Seismic refraction method – 1</td>
<td>Assignment 1</td>
<td>07 May, 4 PM</td>
</tr>
<tr>
<td>9.</td>
<td>22 April</td>
<td>Seismic refraction method – 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>3 May</td>
<td>Seismic reflection - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>10 May</td>
<td>Seismic reflection - 2</td>
<td>Assignment 2</td>
<td>28 May, 4 PM</td>
</tr>
<tr>
<td>12.</td>
<td>17 May</td>
<td>Seismic reflection - interpretation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>24 May</td>
<td>Borehole seismic methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>30 May</td>
<td>Surface waves used in seismic exploration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>07 June</td>
<td>Study Week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>14 June</td>
<td>Examinations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>21 June</td>
<td>Examinations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Semester 1 2015 Laboratory Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Laboratory topic</th>
<th>Assessment</th>
<th>Assessment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>StartUp</td>
<td>22 February</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>01 March</td>
<td>No laboratory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>08 March</td>
<td>Energy partitioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>15 March</td>
<td>Rays and travel time curves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>22 March</td>
<td>Seismic data processing software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>29 March</td>
<td>No lab, Good Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>5 April</td>
<td>Tuition Free Week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>12 April</td>
<td>Tuition Free Week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>19 April</td>
<td>Seismic refraction – 1 (Acquisition geometry, travel time picking)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>26 April</td>
<td>Seismic refraction – 2 (T-plus-minus method)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>31 April</td>
<td>Seismic refraction – 3 (diving waves, Wiechert-Herglotz approach)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>10 May</td>
<td>Seismic reflection – 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>17 May</td>
<td>Seismic reflection – 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>24 May</td>
<td>Checkshot data processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>30 May</td>
<td>Refraction experiment**</td>
<td>Lab book submission</td>
<td>08 June, 4 PM</td>
</tr>
<tr>
<td>15.</td>
<td>07 June</td>
<td></td>
<td>Study Week</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>14 June</td>
<td></td>
<td>Examinations</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>21 June</td>
<td></td>
<td>Examinations</td>
<td></td>
</tr>
</tbody>
</table>

Assessment of lab component of the unit will be done based on completed laboratory books/portfolios. They are due on Monday, Week 15.

* - In the number of enrolled students will exceed computer lab capacity, students will be divided to two groups attending different lab sessions

** - All students will attend one field seismic refraction experiment session.