UNIT OUTLINE - 2013

UNIT:

GEOPHYSICS WORKSHOP 423 /

-Seismic Imaging and Modelling

SPK NUMBER/version: 302615/V4

TEACHING DEPARTMENT: Department of Exploration Geophysics

CREDIT POINTS: 25 / 25

CONTACT HOURS: 5 Hours per week; 1 hour lecture/week; 4 hours workshop/week.

MODE OF STUDY: Internal

PRE-REQUISITES: Qualified for admission to the BSc Geophysics Honours degree

ADDITIONAL REQUIREMENTS: None.

UNIT DESCRIPTION:

To understand advanced seismic data processing, why it is needed, what can be achieved with application of different imaging techniques and why it is so important? Novel concepts explained in a simple applicable way.

SYLLABUS:

Post-stack forward and inverse modelling (acoustic); Important numerical algorithms; Pre-stack imaging, Land data processing (2D and 3D); Elastic waves

UNIT LEARNING OUTCOMES:

• Learn about the concept of wave propagation and wavefield extrapolation.
• Understand the process of migration of seismic data.
• Understand the physics and the application of specialised seismic techniques such as Hilbert transform and Radon transform.
• Learn about crooked and 3D seismic data processing concepts.
• Learn about the difference between pressure and particle velocity
• Learn about elastic waves

RESULT TYPE:

Grade / Mark

UNIT STATUS:

This is a significant and advanced studies unit in Geophysics. It is available for credit in several courses requiring advanced geophysics studies.
UNIT COSTS:

It maybe necessary to charge a levy to students for printing usage especially if access to colour printing is desired. The Department of Exploration Geophysics provides basic printing facilities for student use. A refundable $30 charge is levied for the provision of an ARRC/CSIRO building access card.

ANCILLARY FEES AND CHARGES:

All fee information can be obtained through the Fees Centre. Visit http://www.fees.curtin.edu.au/index.cfm for details.

ATTENDANCE AND SUBMISSIONS:

All sessions must be attended unless prior arrangement has been made.

SUPPLEMENTARY EXAMINATIONS:

No supplementary examination will be offered for this workshop unit.

UNIT COORDINATOR/LECTURER:

The principal lecturer and coordinator for the unit is A/Prof MILOVAN UROSEVIC (ARRC/CSIRO Building, 26 Dick Perry Avenue, Technology Park West, Kensington, WA, Room 4H06), Phone: (08) 9266-2297, or email: M.Urosevic@curtin.edu.au.

Supporting lecturers for this unit are:
A/Prof Andrej Bona: (08) 9266-7194, Email: A.Bona@curtin.edu.au.
Mr. Aleksander Dzunic: (08) 92663521, Email: A.Dzunic@curtin.edu.au.
Mr. Sasha Ziramov: Email: S.Ziramov@curtin.edu.au.

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,
- students’ responsibility to check enrolment,
- deadlines, appeals, and grievance resolution,
- student feedback,
- other policies and procedures
- electronic communication with students

See www.students.curtin.edu.au/administration/responsibilities.cfm for comprehensive information on all of the above.

STARTUP:

Students are made aware of ‘StartUp which is available to all students. This information can be accessed at the following website:–
https://startup.curtin.edu.au/staff/index.cfm
## Lecture/Workshop Outline

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<tr>
<th>Tuition Weeks</th>
<th>Subject</th>
<th>Instructor(s)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Forward modelling – 1D</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>2</td>
<td>Forward modelling – 2D: theory and practice Acoustic, phase shift and finite difference approach</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>3</td>
<td>Post-stack migration techniques (theory and practice)</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>4</td>
<td>Partial pre-stack migration (theory of velocity independent DMO), application</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>5</td>
<td>Full pre stack migration (theory -time, depth)</td>
<td>A. Bóna, A. Dzunic, S. Ziramov</td>
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<tr>
<td>6</td>
<td>Pseudo and full pre-stack migrations (applications)</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>7</td>
<td>Project Presentations</td>
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<tr>
<td>8</td>
<td>Land seismic, crooked data processing (coal-NSW)</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>9</td>
<td>3D land seismic processing (C6)</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>10</td>
<td>S/N improvement and de-multiple techniques</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
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<tr>
<td>11</td>
<td>Seismic attributes – theory and applications</td>
<td>M. Urosevic, A. Dzunic, S. Ziramov</td>
</tr>
<tr>
<td>12</td>
<td>Elastic wave modelling and concluding remarks</td>
<td>M. Urosevic, A. Bóna, A. Dzunic, S. Ziramov</td>
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## Assessment

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<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Individual project presentations*</td>
<td>20%</td>
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<tr>
<td>Lab book (Portfolio)</td>
<td>30%</td>
</tr>
<tr>
<td>Final written Examination</td>
<td>50%</td>
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*A pass in each component is necessary to pass the unit.*

* In Week 4, selected topics will be allocated (related to each student’s specific Honours Thesis research topic). A class presentation will be required in Week 7.

## Textbooks

No Set Text.

Lecture notes will be provided by the Lecturer as required during the semester.

## Reference Books

Yilmaz, O., 1987, Seismic Data Processing: Society of Exploration Geophysicists, Tulsa OK. (not required to be purchased but highly recommended, cost approx. $170.)


**Referencing Style**

The Department of Exploration Geophysics adheres to the referencing style of the SEG (Society of Exploration Geophysicists). Further details can be obtained by viewing their instructions to authors at: http://www.seg.org/SEGportalWEBproject/portals/SEG_Online.portal?nfpb=true&_pageLabel=pg_gen_content&Doc_Ur=prod/SEG-Publications/Pub-Geophysics/instructionstoa.htm


Students should also be aware of alternative referencing styles when preparing assignments. More information can be found on this style from the Library web site: http://library.curtin.edu.au/research_and_information_skills/referencing/index.html

**Generic Information**

**Enrolment and HECS:** it is your responsibility to ensure that your enrolment is correct - you can check your enrolment through the eStudent option on OASIS, www.oasis.curtin.edu.au, and you can also print off an Enrolment eAdvice.

**Semester 1:** you can make requests to have corrections made to your enrolment up to 31 March. The University will not change records after 31 March. HECS liabilities (where they apply) and your results depend on your 31 March enrolment. Withdrawals made after that date will not reduce your HECS liability.

**Semester 2:** you can make requests to have corrections made to your enrolment up to 31 August. The University will not change records after 31 August. HECS liabilities (where they apply) and your results depend on your 31 August enrolment. Withdrawals made after that date will not reduce your HECS liability.

**Student Feedback**

See evaluate.curtin.edu.au to find out when you can eVALUate this unit.

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