Unit Outline

307727 Propagation of Energy 201
Semester 1, 2013

Unit study package number: 307727
Mode of study: Internal
Tuition pattern summary: Lecture: 2 x 1 Hours Weekly
This unit does not have a fieldwork component.
Credit Value: 12.5
Pre-requisite units:
7063 (v.0) Mathematics 102 or any previous version
OR
7492 (v.0) Mathematics 104 or any previous version
AND
302804 (v.0) Physics 101 or any previous version
AND
307726 (v.0) Properties of Matter and Electricity 104 or any previous version
OR
1745 (v.0) Physical Measurements 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.

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Administrative contact:
Name: Judith Tournay
Acknowledgement of Country
We respectfully acknowledge the Indigenous Elders, custodians, their descendants and kin of this land past and present.

Syllabus
Simple harmonic motion (SHM), energy and SHM resonance. The wave equation and its solution. The diffusion equation. Acoustic impedance and the behaviour of travelling waves at an interface. Basic elasticity in solid materials, types of waves in solids, derivation of the wave equation for an isotropic solid. Constitutive relations for simple materials. The nature of electromagnetic radiation, the electromagnetic wave equations. Transport of energy in waves, generation and scattering of electromagnetic waves. The black body spectrum, the classical problem and its resolution by the introduction of quantum mechanics.

Introduction
The unit introduces simple harmonic motion, which leads to derivation of the wave equation and explanation of reflection and transmission at interfaces. Students are later introduced to basic elasticity, waves in elastic materials, and electromagnetic waves together with their application in geophysics.

Learning Outcomes
On successful completion of this unit students can:

<table>
<thead>
<tr>
<th>On successful completion of this unit students can:</th>
<th>Graduate Attributes addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain the fundamental behaviour of simple harmonic waves</td>
<td><img src="https://example.com" alt="✓" /> <img src="https://example.com" alt="✓" /></td>
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<tr>
<td>Derive and explain the Wave Equation</td>
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<tr>
<td>Explain the behaviour of waves, especially acoustic waves at an interface</td>
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</tr>
<tr>
<td>Explain how acoustic wave behaviour at an interface is used for petroleum exploration</td>
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<tr>
<td>Explain radiative transport and scattering mechanisms and its effect with different materials</td>
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</tbody>
</table>

Curtin's Graduate Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Apply discipline knowledge</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Thinking skills (use analytical skills to solve problems)</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Information skills (confidence to investigate new ideas)</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Communication skills</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Technology skills</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Learning how to learn (apply principles learnt to new situations) (confidence to tackle unfamiliar problems)</td>
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<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>International perspective (value the perspectives of others)</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></td>
<td>Cultural understanding (value the perspectives of others)</td>
</tr>
<tr>
<td><img src="https://example.com" alt="✓" /></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: [otl.curtin.edu.au](http://otl.curtin.edu.au)

Learning Activities
Attending and participating in lectures is the main learning activity. Attendance at the lectures should be considered as absolutely necessary for a suitable understanding of the course material. Independent work on assignments will reinforce the lecture material. Students are encouraged to meet with lecturers for any course material for which they need further explanation.
Learning Resources

Recommended Texts

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


Other Resources

Lecture slides available on 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>Assignment 1 Simple harmonic motion</td>
<td>16 percent</td>
<td>Week: 6 Day: Friday</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>Assignment 2 Elasticity</td>
<td>17 percent</td>
<td>Week: 10 Day: Friday</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>Assignment 3 Electromagnetism</td>
<td>17 percent</td>
<td>Week: 14 Day: Friday</td>
<td>2,3,5</td>
</tr>
<tr>
<td>End of semester examination</td>
<td>50 percent</td>
<td>TBA</td>
<td>1,2,3,4,5</td>
</tr>
</tbody>
</table>

Detailed information on assessment tasks

1. Simple Harmonic Motion and Transport Equations: Students will be required to answer questions or do problems related to the lecture material or course content and submit a written report which includes the answers. Assignment details will be provided during the lectures.
   Assignment 1 Marking Criteria:
   1. Completion of the assignment 25%
   2. Demonstrated understanding of the subject matter of the assignment 50%
   3. Presentation of the material 25%

2. Elasticity: Students will be required to answer questions or do problems related to the lecture material or course content and submit a written report which includes the answers. Assignment details will be provided during the lectures.
   Assignment 2 Marking Criteria:
   1. Completion of the assignment 25%
   2. Demonstrated understanding of the subject matter of the assignment 50%
   3. Presentation of the material 25%

3. Electromagnetism: Students will be required to answer questions or do problems related to the lecture material or course content and submit a written report which includes the answers. Assignment details will be provided during the lectures.
   Assignment 3 Marking Criteria:
   1. Full completion of the assignment 25%
   2. Demonstrated understanding of the subject matter of the assignment 50%
   3. Presentation of the material 25%

4. 2 hour theory examination held during the formal Examination Weeks
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 (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 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

All assignments must be accompanied by an Assignment Attachment Form (or cover page) where provided by the Lecturer. Alternatively, assignments need to clearly show the Student's Name, Student ID number, the Title and Number of the Assignment, and the Name of the Lecturer on the first page of their assignment.

Unless otherwise advised by the lecturer/s, all assignments MUST be lodged into the respective Lecturers' Locked Assignment Box, located at the Department of Exploration Geophysics Reception Desk.

All assignments must be received by 5 pm on the Friday of the week due.

Referencing style

Students should use the Chicago referencing style when preparing assignments.

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

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

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.
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. 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/). Recent changes to this unit include:

None

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

## Program Calendar – Semester 1 2013

<table>
<thead>
<tr>
<th>Week</th>
<th>Begin Date</th>
<th>Lecture/Seminar</th>
<th>Assessment Due</th>
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</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>25 Feb</td>
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</tr>
<tr>
<td>1.</td>
<td>4 March</td>
<td>Simple Harmonic Motion</td>
<td></td>
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<tr>
<td>2.</td>
<td>11 March</td>
<td>Impedance and Wave equation</td>
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<td>3.</td>
<td>18 March</td>
<td>Transmission and Reflection of Waves</td>
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<tr>
<td>4.</td>
<td>25 March</td>
<td>Transport phenomena and diffusion equation</td>
<td>12 April</td>
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<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>Introduction to Elasticity</td>
<td></td>
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<tr>
<td>7.</td>
<td>15 April</td>
<td>Waves in Elastic Media</td>
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<tr>
<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>Geometrical Acoustics</td>
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<tr>
<td>10.</td>
<td>6 May</td>
<td>Interface Effects</td>
<td>10 May</td>
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<tr>
<td>11.</td>
<td>13 May</td>
<td>Sources and Properties of Electromagnetic Radiation</td>
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<tr>
<td>12.</td>
<td>20 May</td>
<td>Absorption of Electromagnetic Waves &amp; Radiation Spectra</td>
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<tr>
<td>13.</td>
<td>27 May</td>
<td>Radiation Spectra &amp; Scattering of Particles and Waves</td>
<td>7 June</td>
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<tr>
<td>14</td>
<td>3 June</td>
<td>Summary</td>
<td></td>
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<tr>
<td>15.</td>
<td>10 June</td>
<td>Study Week</td>
<td></td>
</tr>
<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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</table>