



UNIVERSITY
OF TASMANIA

School of Chemistry

Faculty of Science, Engineering and Technology

KRA300
Environmental Monitoring and
Remediation

Semester 1 2009

Unit Outline

Dr Andrew Seen (coordinator)

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Contact details

Unit coordinator/lecturer

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Further information and assistance

If you are experiencing difficulties with your studies or assignments, have personal or life planning issues, disability or illness which may affect your course of study, you are advised to raise these with your lecturer in the first instance.

There is a range of University-wide support services available to you including Teaching & Learning, Student Services, International Services. Please refer to the **Current Students** homepage at: <http://www.utas.edu.au/students/>

Should you require assistance in accessing the Library visit their website for more information at <http://www.utas.edu.au/library/>

Unit description

This unit aims to develop an understanding of the sources and fate of chemical contaminants in the environment and the skills required to undertake an environmental assessment, including formation of sampling plans, selection of monitoring techniques, application of ecotoxicology based guidelines, and an understanding of chemical pathways and processes in the environment. An overview of the technologies used for minimising pollution, disposal and containment of chemical contaminants, and remediation of impacted sites will also be covered.

Specific topics:

Dr Andrew Seen

1. Chemical pathways and processes in the environment
 - How chemicals move through the environment and interact with the environment, humans and biota.
 - Chemical mass balances.
 - How chemical conditions affect chemical partitioning and bioavailability.
 - Degradation and removal processes for chemicals in the environment.
2. Sampling statistics and sampling plans
3. Environmental sampling techniques
 - Air, water, sediments, soil and biomonitors.
4. Quality assurance and quality control in environmental sampling
5. Environmental assessment (based on ANZECC Water Quality Guidelines)
 - Statistical approaches to estimating ecological risk of chemical contaminants.
 - Ecotoxicology based environmental guidelines.
6. Development Proposals and Environmental Management Plans

Dr Trevor Lewis

7. Pollution management technology
8. Waste disposal and contaminant containment
9. Remediation of impacted sites – case studies

Learning outcomes

On successful completion of this unit, you should be able to:

Understand the sources, pathways and fate of chemicals in the environment.

Develop an environmental sampling plan, taking into consideration sampling techniques and QA/QC requirements.

Develop an environmental management plan, taking into consideration waste disposal, contaminant containment and remediation options.

Generic graduate attributes

The University has defined a set of generic graduate attributes (GGAs) that can be expected of all graduates (see <http://www.utas.edu.au/tl/policies/index.htm>). By undertaking this unit you should make progress in attaining the following attributes:

Knowledge: through lectures, tutorials and practicals.

Communication skills: through assignments and reports.

Problem-solving skills: through the completion of problems and fieldwork.

Learning resources required

Requisite texts

Manahan, S. E., Environmental Chemistry, 8th edn, 2004, ISBN 1566706335 (available from The Co-op Bookshop)

Occupational health and safety (OH&S)

The University is committed to providing a safe and secure teaching and learning environment. In addition to specific requirements of this unit you should refer to the University's policy at:

http://www.admin.utas.edu.au/hr/ohs/pol_proc/ohs.pdf

Learning expectations and strategies

Expectations

The University is committed to high standards of professional conduct in all activities, and holds its commitment and responsibilities to its students as being of paramount importance. Likewise, it holds expectations about the responsibilities students have as they pursue their studies within the special environment the University offers.

The University's Code of Conduct for Teaching and Learning states:

Students are expected to participate actively and positively in the teaching/learning environment. They must attend classes when and as required, strive to maintain steady progress within the subject or unit framework, comply with workload expectations, and submit required work on time.

Learning strategies

The teaching of chemistry often relies on the sequential development of ideas, and as such requires an understanding of previously covered material.

To aid your learning you are advised to:

- Review lecture material immediately after lectures to identify specific areas you are having difficulties with and use tutorials as an opportunity to gain assistance with any problems you are having.
- Use learning outcomes and assignment/tutorial problems as a basis for learning.
- Attempt tutorial problems before tutorials and seek help from the appropriate lecturer if required.

Details of teaching arrangements

Unit schedule

Block teaching Monday February 16 to Friday February 20

Monday February 16	Tuesday February 17	Wednesday February 18	Thursday February 19	Friday February 20
10am – 1pm Chemical pathways and processes in the environment (AJS)	8:45am – 1pm visit Rio Tinto Alcan at Bell Bay	9am – 12noon Waste Disposal (TWL)	8:15am – 1pm visit remediated Tioxide site	9am – 2pm Environmental management case study, including development of management and sampling plans (AJS)
2pm – 5pm Sampling statistics and sampling plans, including QA/QC (AJS)	2pm – 5pm Water Treatment (TWL)	1pm – 4:30pm visit Tasmanian Alkaloids	2pm – 5pm Environmental assessment (based on ANZECC Water Quality Guidelines) (AJS)	

Assignments during semester as detailed below.

Specific attendance/performance requirements

Students are required to attend all excursions and workshop/practical classes. A student who does not meet the minimum attendance requirements may be declared not eligible (NE) to be assessed for the unit.

Satisfactory performance of 45% or more is mandatory in both the examination and the internal components for a pass in this unit.

Assessment

Assessment schedule

Assessment task	Date due	Percent weighting
Assignment 1 – Waste disposal case study (assessed as an oral presentation)	Week 4	5%
Assignment 2 – Chemicals in the environment assignment (assessed as a written assignment)	Week 7	5%
Assignment 3 – Environmental management case study, including preparation of an environmental management plan and/or environmental monitoring plan (assessed as a written assignment)	Week 11	30%
End of semester exam		60%

How your final result is determined

The overall mark is based on assignments (40%) and end of semester exam (60%).

Adjustment of the overall marks will occur, where necessary, to fit the Faculty of Science, Engineering and Technology's guidelines for distribution of grades.

Grades will be awarded as follows:

Pass (PP) 50-59% overall, Credit (CR) 60-69% overall, Distinction (DN) 70-79% overall, and High Distinction (HD) 80-100% overall.

Assessment details

Assignments will cover the unit content and learning outcomes as per the assignment title, and may include a mix of numerical problems, review of relevant literature and preparation of desk-top studies. Specific assessment details will be provided for each assignment (e.g. written or oral presentation, length or duration of assignment).

A 3 hour exam covering both theory and application of all sections of the unit will be held during the examination period at the end of Semester 1.

The final exam is conducted by the University Registrar in the formal examination period. See the Current Students homepage (>Examinations and Results) on the University's website.

The end of semester exam is a "closed book" assessment – a Periodic Table and applicable formulae and information will be provided, and students may use any type of hand-held battery operated non-programmable calculator.

Requests for extensions

Any case for an extension based on extenuating circumstances (such as for a medical condition) needs to be made to the unit coordinator by the student prior to the due submission date.

Penalties

A penalty of 10% of the assessed mark will be imposed for each working day that an assignment or report is late. Work submitted more than 10 working days late will not be marked.

For example, if a student submits an assignment 3 days late and the work is assessed at 70% (without penalty), the mark would then be adjusted to $70 - (3 \times 0.1 \times 70) = 49\%$.

Review of results and appeals

Any queries relating to practical, assignment or test marks should be directed to the relevant demonstrator or lecturer, whilst requests for a review of practical, assignment or test marks should be made to the unit coordinator or Head of School.

Formal requests for a review of the final result need to be made on the Request for Review of Assessment form available from Student Administration within 10 days of receipt of the result.

Please read the statement on plagiarism. Should you require clarification please see your unit coordinator or lecturer.

Academic referencing

In your written work you will need to support your ideas by referring to scholarly literature, works of art and/or inventions. It is important that you understand how to correctly refer to the work of others and maintain academic integrity.

Failure to appropriately acknowledge the ideas of others constitutes academic dishonesty (plagiarism), a matter considered by the University of Tasmania as a serious offence.

An appropriate referencing style for this unit is the Vancouver style (used in the *Aust. J. Chem.*):

- In-text references are presented in numerical order, superscript in square brackets, after any punctuation. For example,^[5,17-19]
- The reference list should also have reference numbers in square brackets.
- Initials are listed before surnames and each surname is followed by a comma (no “and” after the penultimate name).
- The journal title should be italicized, followed by the year of publication in boldface, the volume number in italics, and the page number upright.
- Books follow the order authors - title - editors - year, volume, chapter, page - publisher. Computer programs, and patents follow essentially the same order with logical substitutions.
- Some referencing examples:
[5] J. H. Burroughes, D. C. C. Bradley, A. R. Brown, M. K. Mackay, R. H. Friend, P. L. Burn, *Nature* **1990**, 347, 539.
[17] A. B. Bloggs, C. D. Smith, in *Pigments in Nature*, (Ed. M. E. Brown) **1996**, Vol 6, Ch. 8, pp. 98-102 (Pergamon: Chicago, IL).
[18] *Xtal ver. 3.4* (Eds S. R. Hall, D. J. du Boulay, R. Olthof-Hazekamp) **2001** (University of Western Australia: Perth).
[19] L. A Marshall, K. E. Steiner, G. A. Schieser, *U.S. Patent 4 889 858* **1989**.

Referencing styles as used in other internationally recognised scientific journals are permitted.

For information on presentation of assignments, including referencing styles:

<http://www.utas.edu.au/library/assist/gpoa/gpoa.html>

Plagiarism

Plagiarism is a form of cheating. It is taking and using someone else's thoughts, writings or inventions and representing them as your own; for example, using an author's words without putting them in quotation marks and citing the source, using an author's ideas without proper acknowledgment and citation, copying another student's work.

If you have any doubts about how to refer to the work of others in your assignments, please consult your lecturer or tutor for relevant referencing guidelines, and the academic integrity resources on the web at <http://www.utas.edu.au/tl/supporting/academicintegrity/index.html>. The intentional copying of someone else's work as one's own is a serious offence punishable by penalties that may range from a fine or deduction/cancellation of marks and, in the most serious of cases, to exclusion from a unit, a course or the University. Details of penalties that can be imposed are available in the Ordinance of Student Discipline – Part 3 Academic Misconduct, see <http://www.utas.edu.au/universitycouncil/legislation/>

The University and any persons authorised by the University may submit your assessable works to a plagiarism checking service, to obtain a report on possible instances of plagiarism. Assessable works may also be included in a reference database. It is a condition of this arrangement that the original author's permission is required before a work within the database can be viewed.

For further information on this statement and general referencing guidelines, see <http://www.utas.edu.au/plagiarism/> or follow the link under 'Policy, Procedures and Feedback' on the **Current Students** homepage.