3496

Geology 312
Environmental Geology

UNIT OUTLINE

Semester 2 2008
INTRODUCTION

Welcome to Geology 312 – Environmental Geology. The aim of this unit is to provide students with an understanding of the theory and practical application of environmental geology and geochemistry in the assessment of current environmental problems.

Geology 312 has 5 contact hours per week comprising three one-hour lectures and a two-hour practical and tutorial class. In addition, students are required to undertake work towards their practical project and assignments for an average of 5 hours outside the scheduled sessions. The unit has two discrete components. Environmental Geology is presented by Mr Ray Gordon and Dr Qadeer Rathur in a single lecture (*) each week. Environmental Geochemistry is presented by A/Prof. Ron Watkins in two lectures and a two-hour practical/tutorial class each week.

ESSENTIAL ADMINISTRATIVE INFORMATION

Unit Title: Geology 312 – Environmental Geology
Unit Study Package Number: 3496
Unit Coordinator: Ron Watkins
Teaching Area: Department of Applied Geology
Credit Value: 25
Mode(s) of study: Internal
Co-, Pre- and Anti-requisites: Nil
Additional requirements: None
Core Unit status: Geology 312 is a core unit in the BSc (Applied Geology): you may be terminated from this course of study if you fail Geology 312 twice.
Result Type: Grade/Mark
Ancillary Fees and Charges: This unit has no ancillary fees or charges.
Unit Website: Unit materials can be accessed from the associated WebCT site via http://oasis.curtin.edu.au
Faculty or School Website: www.geology.curtin.edu.au
Tuition Pattern:
Lectures (3 hours):
   Wednesday 14.00 - 15.00 Rm. 307.101
   Thursday 15.00 - 17.00 Rm. 312.217
Practical (2 hours): Monday 14.00 - 16.00
or tutorial (2 hours)
   or Monday 16.00 - 18.00
   or Tuesday 14.00 - 16.00
   or Tuesday 16.00 - 18.00
Note: the “practical” sessions will involve groups of students being involved in either laboratory-based practical projects or preparation of assignments/tutorials during different weeks of the semester. Hence, students do not have an open choice of attending one of the four practical sessions.
Study Load: Students are expected to spend an average of five hours per week on completing practical work and preparing assignments in addition to the five hours of contact teaching.
The lecturer for this unit and his contact details are given below:

<table>
<thead>
<tr>
<th>Lecturer:</th>
<th>Ron Watkins</th>
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<tbody>
<tr>
<td>Email:</td>
<td><a href="mailto:R.Watkins@curtin.edu.au">R.Watkins@curtin.edu.au</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>(08) 9266 3577/7824/4326</td>
</tr>
<tr>
<td>Fax:</td>
<td>(08) 9266 4576</td>
</tr>
<tr>
<td>Building &amp; Room:</td>
<td>610.116a / 312.214</td>
</tr>
<tr>
<td>Contact Hours:</td>
<td>Ron is Director of the Environmental Inorganic Geochemistry Group (EIGG) located in Building 610 in Technology Park. Although this is his main office, he can be found during teaching weeks in Room 312.214 immediately adjacent to the secretary’s office in the Department of Applied Geology. If you wish to see him, but cannot find him at his desk in the Applied Geology Building, please call him on 9266 3577/7824 or leave a message with the Departmental Secretary on 9266 7968 and he will arrange to meet you in the Applied Geology Building. Alternatively, you may send him e-mail requesting a meeting, which he will normally respond to within 24 hours. He is also available to speak with you immediately after each of the lectures.</td>
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<table>
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<tr>
<th>Lecturer:</th>
<th>Ray Gordon</th>
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<tbody>
<tr>
<td>Email:</td>
<td><a href="mailto:I.Fitzsimons@curtin.edu.au">I.Fitzsimons@curtin.edu.au</a></td>
</tr>
<tr>
<td>Phone:</td>
<td>(08) 9266 7968</td>
</tr>
<tr>
<td>Fax:</td>
<td>(08) 9266 3153</td>
</tr>
<tr>
<td>Building &amp; Room:</td>
<td>312 – 208A</td>
</tr>
<tr>
<td>Contact Hours:</td>
<td>Ray is a practicing environmental engineering consultant in Perth. He is thus not normally present at the university outside of lectures. He can be contacted through the unit coordinator.</td>
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The teaching staff will assist you with your learning and any problems or difficulties you may be experiencing while undertaking this unit. They will also mark your assignments and provide feedback in relation to your progress in this unit.

If you leave a message for a lecturer on e-mail or telephone they will try to respond as soon as possible, but please allow for a response time of up to 5 working days.

UNIT COORDINATOR

Every unit also has a person who is responsible for the overall administration of that unit. This person is the Unit Coordinator. If you cannot contact the person who is teaching you at the time or if you have general administrative queries about this unit, you may wish to contact the Unit Coordinator for this unit.

UNIT SYLLABUS

Environmental Geochemistry - principles of environmental geochemistry. Quantifying contamination and pollution of the natural environment. Contaminant speciation and the role of water, colloids and organic materials in chemical pollution. Geochemical-biological interactions and toxicity. Mining pollution, estuarine pollution and urban geochemistry. Environmental geochemical analysis and the practical study of contaminated urban and/or mining sites.

LEARNING OUTCOMES

On successful completion of this unit you will be able to:

1. Explain the sources, transport mechanisms and sinks of mining, industrial, urban and agricultural pollutants
2. Explain and assess the risks involved in a broad range of natural and human-induced geohazards
3. Evaluate potentially contradictory data on the impact of topical environmental issues, showing awareness of different community perspectives and the use of international benchmarks
4. Assess environmental contamination through sampling and geochemical analysis and recommend mediation protocols
5. Prepare a written consultancy report for external project sponsors

LEARNING ACTIVITIES

This unit involves the following learning activities:

A one-hour lecture each week provides information on environmental geology - the more physical influences on the environment. Two one-hour lectures discuss topics of environmental geochemistry.

The two-hour practical classes are used to undertake an actual environmental geochemical research study on a topic of the mining or urban environment. Students take part in various techniques of geochemical analysis and compile a brief report that will be employed in producing an overall report for the industry sponsors of the project. Students also use half of the practical sessions involved in preparing for two marked assignments: participation in a group discussion on a topic of environmental interest, and presentation of a short seminar on a specific environmental topic.

STUDENT FEEDBACK

For Semester 2 eVALUate is open for student feedback in weeks 12 - 17.

For other study periods see http://evaluate.curtin.edu.au/info/dates.cfm

We welcome your feedback as one way to keep improving this unit. Later this semester, you will be encouraged to give feedback on the through eVALUate, Curtin’s on-line student feedback system (see http://evaluate.curtin.edu.au). Recent changes to this unit in response to student feedback through eVALUate include:

1. Provision of marks for either the practical work or assignments during, rather than at the completion, of the semester.
2. Additional assistance in the writing and presentation of geochemical data in the practical report.
3. Formal tutorial sessions to assist students in the preparation of material for assignments.
LEARNING RESOURCES

The following resources will be posted on the WebCT site for this unit:

1. Copy of this unit outline
2. Fact-sheets for a majority of the lectures
3. Powerpoint presentations as given in the lecture theatre and i-lectures, where possible
4. Information to assist in the undertaking of the practical projects.

TEXT BOOKS

Essential Texts:
There are no textbooks that you need to purchase in order to complete this unit.

Recommended Texts:
No single textbook adequately covers the full scope of the Environmental Geochemistry and Environmental Geology components of the unit. *Environmental Geology: Principles and Practice* by Fred G. Bell and published in 1998 by Blackwell Science is a good general text for Environmental Geology. *Principles of Environmental Geochemistry* by G.N. Eby covers many of the topics dealt with in the main geochemical part of the unit. Much useful information will be found in the form of journal papers that will be referred to in the lectures, and students should keep careful notes from the lectures. Much up-to-date factual information is available on the Internet. However, students should evaluate the academic credibility of each web-site most carefully, before assuming all information provided is sound.

ASSESSMENT DETAILS

Assessment Summary
The assessment for this unit consists of the following items.

<table>
<thead>
<tr>
<th>Assessment Tasks</th>
<th>Worth</th>
<th>Due</th>
<th>Unit Learning Outcome Assessed</th>
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<tbody>
<tr>
<td>Environmental Geology assignment</td>
<td>5 %</td>
<td></td>
<td>2, 3</td>
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<tr>
<td>Environmental Geochemistry/Geology assignments</td>
<td>15 %</td>
<td></td>
<td>2, 3</td>
</tr>
<tr>
<td>Practical work and report</td>
<td>20 %</td>
<td></td>
<td>1, 4, 5</td>
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<tr>
<td>Theory Exam</td>
<td>60 %</td>
<td>Exam Period</td>
<td>1, 2, 3</td>
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<tr>
<td>TOTAL</td>
<td>100%</td>
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Assessment 1 – Environmental Geology assignment

*Worth: 5%*

Assessment 2 – Environmental Geology/Geochemistry Assignments

*Worth: 15%*

(a) Students are required to seek out up-to-date information relevant to a broad topic of environmental interest and present and discuss the information within a (max. 2 hr) group discussion.

*Marking criteria will be:*

- Breadth of material accessed and presented during the discussion, and its relevance to the chosen topic
- Degree to which the presented material is clearly understood by the student
- Contribution to the group discussion by means of the presentation of material and participation in the evaluation of information and ideas

(b) Students are required to seek out up-to-date information relevant to a specialised topic of environmental interest and to present it concisely in the form of an 7.5 minute mini-seminar. Students are further required to submit a brief and precise (max. 2 page) summary of the salient information presented in their seminar.

*Marking criteria will be:*

- Selection of the most important material for presentation in the mini-seminar, and the absence of less relevant or inappropriate information
- Degree to which the material presented in the mini-seminar and included in the written summary reflects the most recent information and current scientific opinion on the chosen topic
- Clarity of presentation and depth of understanding of the chosen topic
Assessment 3 – Environmental Geochemistry Project - Laboratory work and final report

Worth: 20% (lab. wk 5%; final report 15%)

Students are required to work in groups of three in completing a short program of environmental geochemical analysis. In 2008, the industry-sponsored projects will involve the assessment of mining wastes as potential sources of acid mine drainage. It is also hoped to have one project on acid sulphate soils in the Perth region. Students will be marked on the following:

(a) Performance of tasks during the laboratory sessions (5%).

Marking criteria will be:

- Effort made in performing individual analytical procedures
- Degree of understanding of the nature and purpose of the analytical procedures

(b) Writing of the practical report (15%).

Marking criteria will be:

- Accuracy and clarity of presentation of analytical results
- Use of analytical data in the characterization of the environmental risk
- Appreciation of the significance of the analytical results as indicated by reasoned arguments and discussion

Assessment 4 – Final examination

Worth: 60%

The duration of the theory exam is 2 hours. The exam comprises two sections. You will be asked to answer one question from section A, and three questions from section B. All questions are of equal value.

Section A is concerned with environmental geology and is worth 15%.

Section B is concerned with environmental geochemistry and is worth 45%.

You will be given information on the format of the exam paper during the final lecture of the unit.

Previous theory exam papers for this unit and others taught by Applied Geology are available online at http://library.curtin.edu.au/exampapers/Sci_Eng/Department_of_Applied_Geology/

Assignment 3 Marking Criteria

To score highly in the theory exam you will need to:

- Provide factually correct answers to the questions.
- Provide factual information and present ideas beyond those presented in the lecture course.
• Present arguments in a logical fashion.
• Provide illustrations where appropriate.

Referencing Style
Students should use the Chicago author-date referencing style when preparing assignments. More information can be found on this style from the Library web site: http://library.curtin.edu.au/referencing/index.html.

Guidelines for Submission:
All assignments must be accompanied by an Assignment Cover Sheet.
All assignments must be received by 5 pm on the Friday of the week due.
Marks will be lost for late submission of assignments at a rate of 5% per day, except where an extension is negotiated prior to the assessment due date or where unforeseen medical, family or other issues prevent timely submission. Extensions will usually require supporting documentation.

Assignment Marking
Students should allow a 2 week marking turnaround for the written part of the assignments.

STUDENTS’ 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.

ADDITIONAL INFORMATION
Deferred and Supplementary Assessment
You might be granted a deferred assessment for this unit if you are unable to complete an assessment task due to documented circumstances outside of your control, or a supplementary assessment when your final grade from the unit is between 45 and 50 and your academic record and personal circumstance warrant a second chance to pass the unit.
Deferred and supplementary exams will be held in Orientation Week of Semester One 2009 to accommodate the high number of student with vacation work. Students expecting to complete their degree this semester will have the opportunity to take any supplementary or deferred exams earlier to allow them to meet deadlines for graduation.
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 Advice.

You can make requests to have corrections made to your Semester One 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.