UNSW Course Outline

GEOS3281 Applied Geochemistry - 2024

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General Course Information

Course Code : GEOS3281
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Biological, Earth and Environmental Sciences
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

<u>Useful Links</u>

<u>Handbook</u> <u>Class Timetable</u>

Course Details & Outcomes

Course Description

This course examines the characteristics, source and fate of metal contaminants in natural and urban environments, via a combination of lectures, laboratories and a field excursion. The course covers (1) primary and secondary dispersion of elements and weather processes; (2) principles

of water, soil, drainage sediments, rocks and vegetation geochemistry as applied to environmental assessments; (3) aqueous geochemistry and contaminant modelling, with reference to Australian case studies; and (4) introduction to geochemical sampling, analytical techniques and the design of environmental surveys. The course involves a series of recorded lectures and prescribed readings that provide an overall framework to the main themes and supports the laboratories in which students will examine regolith materials and undertake modelling and interpretation of various real-world geochemical datasets.

Assumed Knowledge: students should have completed at least one of: GEOS1111, GEOS1211 or GEOS1701 and HSC-level Chemistry.

Course Aims

The primary aims of the course are to provide advanced skills and knowledge in the geochemistry of surface environments relating to both the design and implementation of mineral exploration surveys and environmental assessments. The practical session will range from the analysis of regolith core samples to data modelling. Students will be provided with a range of real-world datasets and an introduction to the geological setting, survey objectives and the sampling and analytical methods used to generate the datasets. The course is a directed elective within the earth science and environmental sciences majors spanning general areas of geochemistry that are directly relevant to professional practice in those fields.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe the main processes involved in development of regolith and the behaviour of metals in such environments based on both mineralogical and morphological characteristics of weathered profiles and various modelling approaches.
CLO2 : Describe and model fundamental geochemical processes that control element mobility in regolith and groundwater.
CLO3 : Review examples of geochemical maps at local to continental scales for environmental and exploration purposes.
CLO4 : Model and interpret data obtained from an abandoned mine site (AMD issues) and present key results in a technical report.
CLO5 : Analyse and present data from case studies in applied geochemistry.
CLO6 : Undertake modelling of regional geochemical data using a variety of population and spatial statistical methods including assessment of associated data presentation approaches.

Course Learning Outcomes	Assessment Item
CLO1 : Describe the main processes involved in development of regolith and the behaviour of metals in such environments based on both mineralogical and morphological characteristics of weathered profiles and various modelling approaches.	• Laboratory Exercises
CLO2 : Describe and model fundamental geochemical processes that control element mobility in regolith and groundwater.	• Laboratory Exercises
CLO3 : Review examples of geochemical maps at local to continental scales for environmental and exploration purposes.	• Laboratory Exercises
CLO4 : Model and interpret data obtained from an abandoned mine site (AMD issues) and present key results in a technical report.	• Field Report
CLO5 : Analyse and present data from case studies in applied geochemistry.	• Seminar • Field Report
CLO6 : Undertake modelling of regional geochemical data using a variety of population and spatial statistical methods including assessment of associated data presentation approaches.	• Field Report • Laboratory Exercises

Learning and Teaching Technologies

Moodle - Learning Management System

Additional Course Information

See Course Manual in Moodle

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Seminar Assessment Format: Individual Short Extension: Yes (3 days)	20%	
Field Report Assessment Format: Individual Short Extension: Yes (3 days)	20%	
Laboratory Exercises Assessment Format: Individual Short Extension: Yes (3 days)	60%	

Assessment Details

Seminar

<u>Assessment Overview</u>

You will summarise key aspects of a topic in environmental or exploration geochemistry of your choice (but approved by the course convener) using a selection of articles, reports, and scientific publications. Students will present this information in a 15 minute seminar in Week 10. Seminar grades will be assigned based on the quality of the information, the quality and relevance of the slides or images, an engaging verbal presentation, the capacity to answer questions from others in the class and to ask questions of other presenters.

Feedback will be given in the Moodle gradebook by the end of the course.

<u>Course Learning Outcomes</u>

- CLO5 : Analyse and present data from case studies in applied geochemistry.

Field Report

<u>Assessment Overview</u>

You will examine geochemical datasets obtained at the historic Sunny Corner mine site over the last 20 years. You will select aspects of the geochemical databases to undertake geochemical modelling aimed at either elucidating key geochemical controls on metal mobility or site environmental management approaches.

Results will be presented in the form of a technical report (due in Week 8) worth 20% of the final mark.

Feedback will be given by the course academics via Moodle gradebook within two weeks of the report submission.

<u>Course Learning Outcomes</u>

- CLO4 : Model and interpret data obtained from an abandoned mine site (AMD issues) and present key results in a technical report.
- CLO5 : Analyse and present data from case studies in applied geochemistry.
- CLO6 : Undertake modelling of regional geochemical data using a variety of population and spatial statistical methods including assessment of associated data presentation approaches.

Laboratory Exercises

<u>Assessment Overview</u>

You will complete a number of laboratory sessions ranging from examining of drill cores and associated geochemical data, modelling aqueous geochemical data, interpreting analytical quality control information, explaining patterns and processes in regional geochemical mapping data and investigating trends in isotopic data.

The results will be presented in three short laboratory reports that cover (1) aqueous geochemical modelling with VMinteq), (2) assessment of the soil geochemical atlases of Cyprus and Australia and (3) analytical quality assessments.

Each of these is worth 20% of the final mark, due in weeks 3, 5 and 7 of Term. Written feedback on the reports will be provided via Moodle within 2 weeks of submission. Feedback on the first report will be given in Week 4 and during the first practical exercise.

<u>Course Learning Outcomes</u>

- CLO1 : Describe the main processes involved in development of regolith and the behaviour of metals in such environments based on both mineralogical and morphological characteristics of weathered profiles and various modelling approaches.
- CLO2 : Describe and model fundamental geochemical processes that control element mobility in regolith and groundwater.
- CLO3 : Review examples of geochemical maps at local to continental scales for environmental and exploration purposes.
- CLO6 : Undertake modelling of regional geochemical data using a variety of population and spatial statistical methods including assessment of associated data presentation approaches.

General Assessment Information

See Course Manual in Moodle

Grading Basis

Standard

Requirements to pass course

50% overall mark

Course Schedule

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

See Course Manual in Moodle

Course Resources

Prescribed Resources

See Course Manual in Moodle

Recommended Resources

See Course Manual in Moodle

Additional Costs

Nil

Course Evaluation and Development

See Course Manual in Moodle

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	David Cohen					No	Yes
	David Cohen					No	No
	David Cohen					No	No

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand

your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

Important note: UNSW has a "fit to sit/submit" rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- [The Current Students Gateway](#)
- [Student Support](#)
- [Academic Skills and Support](#)
- [Student Wellbeing, Health and Safety](#)
- [Equitable Learning Services](#)
- [UNSW IT Service Centre](#)
- Science EDI Student [Initiatives](#), [Offerings](#) and [Guidelines](#)