

**School / Faculty:** Faculty of Science and Technology

**Course Title:** APPLIED GEOCHEMISTRY

**Course ID:** SCGEO3103

**Credit Points:** 15.00

**Prerequisite(s):** SCGEO1102 or SCGEO1103

**Co-requisite(s):** Nil

**Exclusion(s):** Nil

**ASCED Code:** 010707

**Grading Scheme:** Graded (HD, D, C, etc.)

**Program Level:**

| AQF Level of Program |   |   |   |   |   |    |
|----------------------|---|---|---|---|---|----|
|                      | 5 | 6 | 7 | 8 | 9 | 10 |
| <b>Level</b>         |   |   |   |   |   |    |
| Introductory         | ■ | ■ | ■ | ■ | ■ | ■  |
| Intermediate         | ■ | ■ | ■ | ■ | ■ | ■  |
| Advanced             | ■ | ■ | ✓ | ■ | ■ | ■  |

**Learning Outcomes:**

This course introduces students to key concepts in the fields of exploration and environmental geochemistry. Students will learn about the geochemistry of the planet and develop skills in manipulating and interpreting exploration and environmental geochemical data, as well as experience a range of sampling methods and analytical techniques. On completing this course students will be able to:

**Knowledge:**

- K1.** Review and communicate the basic principles of aqueous chemistry
- K2.** Explain the importance of geochemical process in shaping our universe
- K3.** Appraise and analyse the variety of geochemical sampling methods and techniques in the context of exploration, environmental and material/mining applications
- K4.** Assess the role of element dispersion in exploration and environmental contexts

**Skills:**

- S1.** Plan and safely apply appropriate survey techniques
- S2.** Analyse and interpret geochemical data in exploration, environmental and material/mining contexts and communicate key geochemical concepts
- S3.** Apply and appraise appropriate Quality Assurance/Quality Control techniques into relevant sampling procedures and data analysis
- S4.** Investigate an area of geochemistry and report findings in both written and verbal form

# Course Outline (Higher Education)

SCGEO3103 APPLIED GEOCHEMISTRY

## Application of knowledge and skills:

- A1.** Analyse and interpret geochemical data and relate to geology, mineralisation/contamination, and weathering processes
- A2.** Select and apply appropriate geochemical sampling techniques
- A3.** Differentiate and apply Quality Assurance/Quality Control in field sampling exercises
- A4.** Demonstrate research and communication skills

## Course Content:

Topics may include:

- The origin of elements, and geochemistry of the Universe
- Basic chemical principles such as pH, Eh, solubility, dispersion, standards, precision/accuracy, contamination, speciation, and chemical data presentation for specific purpose
- Analytical methods and their cost benefits
- Survey methods including stream sediment, soil, rock, biogeochemistry, gas, water and questionnaire
- Sampling theory and statistical analysis of geochemical data
- Chemical dispersion and its role in exploration and environmental geochemistry
- Environmental geochemistry: problems facing our community including landfill and contaminated sites

## Values and Graduate Attributes:

### Values:

- V1.** Relate the geochemical cycle to various aspects of the Earth's living system
- V2.** Defend the role of QA/QC in geochemical studies

### Graduate Attributes:

FedUni graduate attributes statement. To have graduates with knowledge, skills and competence that enable them to stand out as critical, creative and enquiring learners who are capable, flexible and work ready, and responsible, ethical and engaged citizens.

| Attribute                        | Brief Description  | Focus |
|----------------------------------|--|-------|
| Knowledge, skills and competence | The knowledge and skills obtained by students in this course are applicable in a wide range of related disciplines, and provide students with a deeper understanding the processes that shape the world around them. Giving students a more detailed look at the geochemical processes that have shaped our planet, opens doors to even more focused learning in related areas of geosciences, and helps link geochemistry to other earth processes. | High  |

# Course Outline (Higher Education)

SCGEO3103 APPLIED GEOCHEMISTRY

| Attribute                                 | Brief Description  | Focus  |
|---|--|--------|
| Critical, creative and enquiring learners | As an advanced level course, Applied Geochemistry gives students the opportunity to build on their knowledge, and relate their understanding of geological principles to the chemistry of the earth, and the effects of weathering on both mineralisation, and contamination. Students are required to undertake self-directed research on an allocated topic related to the course content and produce both a detailed literature review, and accompanying presentation. Students develop self reliance through managing their workload and scheduling their various assessment tasks throughout the semester, as well as relating their theoretical knowledge and practical skills in a field based setting. | High   |
| Capable, flexible and work ready          | The course content will assist students appreciate the interconnected between the scientific disciplines, as well as highlight the importance of geochemical process in both an exploration, and environmental context.  | Medium |
| Responsible, ethical and engaged citizens | The relevance of Geochemistry in helping society manage earth resources, and its role in identifying and understanding environmental contamination help the students engage with issues of real importance to society.   | Medium |

## Learning Task and Assessment:

| Learning Outcomes Assessed | Assessment Task  | Assessment Type   | Weighting |
|----------------------------|--|---|-----------|
| K1 - K3, S2, S3, A1        | Examination of geochemical data                                  | Practical assignments                                     | 20-30%    |
| K3, K4, S1-S4, A1-A3, V2   | Execution and evaluation of a sampling program (field excursion) | Written report from field excursion and sampling exercise | 10-20%    |
| K1 - K3, S4, A4, V1        | Case study   | Written report and oral presentation                      | 15-20%    |
| K1-K4, S2-S4, A1-A2, V2    | Review of lecture, practical and reading content                 | Examination   | 30-40%    |

## Adopted Reference Style:

APA