

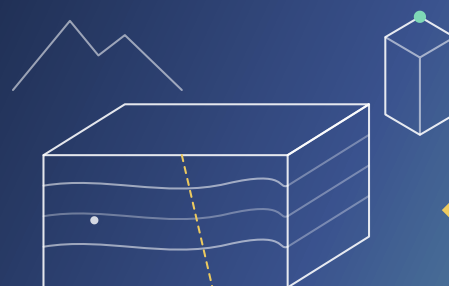
Module code

SPG-2204

Type of module

Undergraduate: Geosciences – Major Core

Geochemistry



Modular credits

4

Total student
engagement

56 hours

Prerequisite

None

Anti-requisite

None

Aims

To introduce students to Earth systems chemistry and chemical evolution, applying geochemical concepts to contemporary issues. It examines processes crucial for understanding anthropogenic impacts and environmental sustainability, with hands-on experience in modern geochemical methods.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Analyse the fundamental principles of geochemistry, including element behaviour, thermodynamics, and kinetics, as they apply to Earth systems and planetary processes.

MLO 2

Apply modern analytical techniques and quality assurance procedures to collect, analyse and interpret geochemical data.

MLO 3

Evaluate the interactions between water, minerals, and rocks in both low and high-temperature environments, including mineral dissolution processes and their environmental implications.

MLO 4

Assess anthropogenic impacts on geochemical cycles and develop strategies for sustainable resource management.

MLO 5

Communicate geochemical concepts and research findings effectively through various formats including reports, presentations, and digital visualisations.

Module contents

Fundamental Principles:
Element behaviour in Earth systems, planetary accretion, and analytical lithogeochemistry covering elemental distribution and geochemical differentiation

Core Geochemical Processes:
Thermodynamics and kinetics in geochemical systems, including equilibrium concepts and reaction rates

Applied Geochemistry: Aquatic geochemistry, mineral dissolution, and high temperature geochemistry focusing on water-rock interactions and mineral breakdown processes

Environmental Applications:
Environmental geochemistry exploring human impacts on geochemical cycles, pollution and resource management

Digital Skills: QGIS workshop for geochemical mapping and data visualisation, providing industry-relevant digital skills

Hands-on Laboratory Work:
Practical sessions including pXRF analyses, acid safety, thermodynamics experiments, and carbonate solubility studies

Field Experience: Field sampling and analyses for geochemical mapping using modern techniques

Assessment Components:
Various assignments including quizzes, reports, infographics, and a mini-project culminating in lightning talks

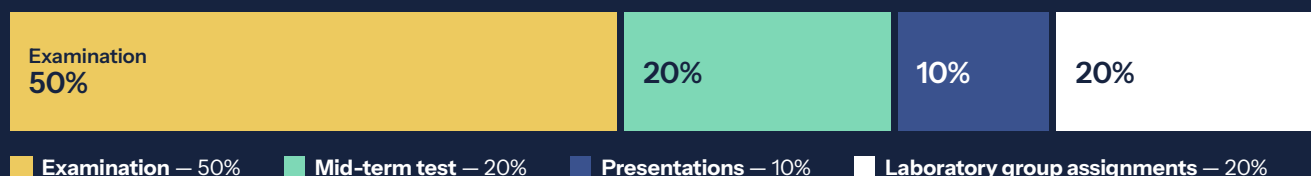
Assessment

50%

Examination

50%

Coursework



Formative assessment	Summative assessment	
Weekly discussion and feedback	COMPONENT	WEIGHTING
	Examination	50%
	Coursework	50%
	Individual	30%
	Mid-term test	20%
	Presentations	10%
	Group	20%
	Laboratory group assignments	20%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1	PLO 1 (Fundamental Theoretical Knowledge in Geosciences)	2	PLO 2 (Application of Scientific Methods and Data Analysis)
3	PLO 3 (Integrated Laboratory, Field, and Technical Skills)	4	PLO 4 (Critical Thinking and Problem-Solving Skills)
5	PLO 5 (Sustainability and Responsible Practice)	6	PLO 6 (Communication and Collaboration Skills)
7	PLO 7 (Independent Learning and Professional Development)		

Sustainability concept addressed

4	SDG 4 Quality Education
12	SDG 12 Responsible Consumption and Production
13	SDG 13 Climate Action

Digital skills/software used (not limited to)

- Application software (e.g. Microsoft Word, Microsoft Excel, QGIS, Video Editing Software)
- Organisational tools (e.g. Notion)
- Advanced digital tools (e.g. Generative AI tools)

Micro-credentialling option Yes, 4 MCs	Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes No
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Document details

Office **ODVCE** Document date **23 June 2026** Status **New** Approval **GBF (12/02/2006)**