

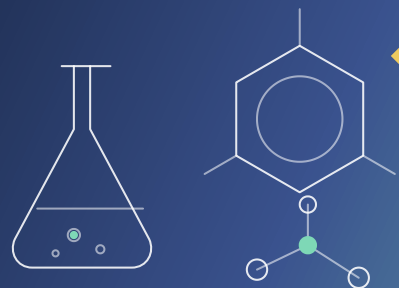
Module code

SPC-2207

Type of module

Undergraduate: Chemistry – Major Core

Frontiers in Analytical Chemistry



Modular credits

4

Total student
engagement

56 hours

Prerequisite

None

Anti-requisite

None

Aims

To develop students' understanding of key instrumental and electrochemical techniques used in chemical analysis. It emphasises the principles, applications, and interpretation of data generated from these analytical methods.

Module learning outcomes (MLO)

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

MLO 1

Analyse the principles and applications of advanced spectroscopic, radiochemical, chromatographic, and electroanalytical techniques used in modern chemical analysis.

MLO 2

Evaluate the suitability, strengths, and limitations of contemporary separation and extraction methods for addressing complex analytical challenges.

MLO 3

Analyse the design and functionality of bioanalytical devices, microfluidic systems, and integrated analytical platforms for chemical and biological measurements.

MLO 4

Evaluate the application of emerging analytical technologies, including electrochemical, optical, and nanostructured sensing systems, for solving real-world analytical problems.

MLO 5

Critically evaluate the role of automation, artificial intelligence, and machine learning in enhancing analytical workflows, data interpretation, and decision-making.

Module contents

Radiochemical methods	Molecular spectroscopy: Luminescence, mass spectrometry, key molecular analyses	Chromatographic methods: Principles, instrumentation, GC, GC-MS, HPLC, IC, applications
Electroanalytical methods: Potentiometry, coulometry, electrogravimetry, voltammetry, analytical problem-solving	Electrochemical and optical analysis: Electroanalysis, ECL, SPR, plasmonic and photonic nanostructures	Separation and extraction techniques: Membrane separation, CE, FFF, SFC, SPME analytical methods
Sampling and automation: Food and biospecimen analysis, pathogen detection, robotic automation	Bioanalytical devices: μ TAS, flexible microfluidics, integrated analytical and diagnostic platforms	Emerging frontiers: AI and machine learning for analytical data interpretation

Assessment

60% **40%**
Examination Coursework



■ Examination — 60% ■ Assignments — 20% ■ Class tests — 20%

Formative assessment

Weekly discussion and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	40%
Assignments	20%
Class tests	20%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1	PLO 1 (Fundamental Knowledge in Chemistry)	3	PLO 3 (Critical Thinking and Problem-Solving Skills)
6	PLO 6 (Digital Literacy and Lifelong Learning Skills)		

Sustainability concept addressed

4	SDG 4 Quality Education
9	SDG 9 Industry, Innovation and Infrastructure
12	SDG 12 Responsible Consumption and Production

Digital skills/software used (not limited to)

- Word processing software (e.g. Microsoft Word)
- Organisational tools (e.g. Outlook calendar)
- Learning Management System (e.g. Canvas)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

Office **ODVCE** Document date **27 June 2026** Status **New** Approval **GBF (12/02/2026)**