

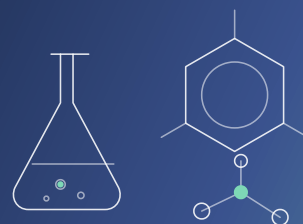
Module code

SPC-3409

Type of module

Undergraduate: Chemistry – Elective

Electrochemical Principles and Applications



Modular credits

2

Total student engagement

28 hours

Prerequisite

SPC-1203
Fundamentals of
Physical and
Spectroscopic
Chemistry

Anti-requisite

None

Aims

To provide students with a solid foundation in electrochemical principles and their real-world applications. It covers key concepts relevant to energy systems (fuel cells, batteries, supercapacitors) and industrial processes (electrolysis, electroplating, corrosion), with an emphasis on quantitative analysis and practical relevance.

Module learning outcomes (MLO)

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

MLO 1

Analyse and apply core electrochemical principles, including cell types, electrode potentials, the Nernst equation, and thermodynamic relationships.

MLO 2

Analyse and compare the performance of various electrochemical energy systems (e.g. fuel cells, batteries), utilizing efficiency metrics and calculation techniques.

MLO 3

Apply quantitative methods, such as Faraday's Law, to calculate material yields, energy consumption, and electrochemical performance in practical scenarios, including industrial applications like electroplating, corrosion prevention, and cathodic protection.

Module contents

Fundamental electrochemical principles

Electrochemical cells

Applications of standard electrode potentials for determination of thermodynamic functions

Applications of electrochemical principles on energy systems	Principles, uses and performance of fuel cells, and battery chemistries	Applications of electrochemical principles on industrial electrochemistry
Electroplating and corrosion		

Assessment

60%

Examination

40%

Coursework



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

Formative assessment

Weekly discussion and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	40%
Assignments and Quizzes	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

Digital skills/software used (not limited to)

Word processing software (e.g. Microsoft Word)
Data processing software (e.g. Microsoft Excel)
Learning management system (e.g. Canvas)

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

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