

Module code

SPC-3411

Type of module

Undergraduate: Chemistry – Elective

Biosensors, Biochips and Nanobiotechnology



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 comprehensive understanding of the principles, design, fabrication, and applications of biosensors, biochips, and nanobiotechnology, with emphasis on emerging technologies and real-world impact.

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, recognition elements, and transduction mechanisms underlying biosensors.

MLO 2

Analyse biosensor design through immobilisation strategies, interface engineering, and signal detection methods.

MLO 3

Evaluate biosensor applications, commercialisation, and ethical or regulatory implications across key sectors.

Module contents

Introduction: Definition, history, and evolution of biosensors, biochips, nanobiotechnology

Recognition receptors: DNA, RNA, aptamers, antibodies, cells, and acellular systems

Immobilisation and interfaces: SAMs, nanomaterials, encapsulation, flexible substrates, wearable applications

Detection methods: Electrochemical, optical, magnetic, and label-based signal processing approaches

Design and fabrication: Printing, lithography, BioMEMS, 3D/4D, sustainable material integration

Wearables and devices: Paper-based sensors, smartphones, wireless, IoT-enabled biosensing platforms

Applications and ethics: Uses, commercialisation pathways, ethical and regulatory considerations

Assessment

60% **40%**
Examination Coursework



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

Formative assessment

Weekly discussion and feedback

Summative assessment

COMPONENT		WEIGHTING
Examination		60%
Coursework		40%
Individual		20%
Class tests		20%
Group		20%
Assignment		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)
4	PLO 4 (Communication and Collaborative Skills)	5	PLO 5 (Project Management Skills and Ethics)
6	PLO 6 (Digital Literacy and Lifelong Learning Skills)		

Sustainability concept addressed

3	SDG 3 Good Health and Well-Being
7	SDG 7 Affordable and Clean Energy
9	SDG 9 Industry, Innovation and Infrastructure

Digital skills/software used (not limited to)

- Word and image processing softwares
- Organisational tools (e.g. Outlook calendar)

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)