

# Unit Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science & Sustainability
<b>Unit Title:</b>	Advanced Bioanalytical Techniques
<b>Unit ID:</b>	SCBCH3010
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	(SCMOL2001 or SCCHM2001)(SCBCH2001 or SCMIC2001 or SCMOL2010)
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	(SCMOL3010)
<b>ASCED:</b>	019909

## Description of the Unit:

This unit will introduce students to advanced methods and techniques that are used in contemporary biological, biomedical and chemical laboratories. The content of the multidisciplinary unit will be dynamic reflecting the learning needs of students enrolled in laboratory-focused programs (such as biomedical science and other analytical sciences) and relevant to industry and research. The methods covered in this unit have diverse applications, including research, disease diagnosis and management, environmental analysis, forensic analysis and industry; and can be used in all fields of biomedicine, biotechnology and analytical chemistry. A major focus of this unit is on the development of understanding of the use of bioanalytical techniques to achieve desired experimental outcomes, practical skills and the application of methods and techniques. This approach will lay the foundation for students to continue to understand and develop new methods and techniques in the future.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

## Work Experience:

No work experience: Student is not undertaking work experience in industry.

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

**Course Level:**

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	■	■	■	■	■	■
Intermediate	■	■	■	■	■	■
Advanced	■	■	✓	■	■	■

### Learning Outcomes:

On successful completion of the unit the students are expected to be able to:

#### Knowledge:

- K1.** Identify scientific concepts that underpin advanced bioanalytical methods.
- K2.** Discuss the importance of quality assurance and control and statistical validity of sampling in the application of advanced techniques to address different real-world problems.
- K3.** Determine and justify the use of specific bioanalytical methods for use in a range of medical, research and industrial applications.

#### Skills:

- S1.** Demonstrate hands on proficiency in a variety of contemporary laboratory techniques including evaluation and interpretation of results.
- S2.** Demonstrate a high-level scientific problem-solving, investigation and experimental design skillset.
- S3.** Effectively communicate scientific concepts, results and conclusions including in a data retention context.

#### Application of knowledge and skills:

- A1.** Design appropriate experimental methodology that leverages advanced bioanalytical techniques, appropriate quality assurance and control, process optimisation, and data analysis.
- A2.** Articulate complex solutions and results to industrial, diagnostic, and research-relevant problems.

#### Unit Content:

The unit content will be reviewed annually to ensure content:

- Reflects the learning needs of students enrolled in biological, biomedical and chemical focussed courses.
- Remains highly relevant to industry and research .
- Lays the foundation, as much as practicable and predictable, for students to continue to understand new methods and techniques as they develop in the future.

As such, the unit content will be dynamic rather than static. Broadly, the topics covered in the unit are likely to cover:

- The development of, implementation of, and theory behind contemporary bioanalytical methods and techniques, including biotechnology methods and chemical analysis.
- Conduct laboratory work and data analyses consistent with the current applications of bioanalytical methods.
- Generate, collate, evaluate, interpret and communicate experimental results.

#### FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge)

provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	<p>Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in:</p> <ul style="list-style-type: none"> <li>Using effective verbal and non-verbal communication</li> <li>Listening for meaning and influencing via active listening</li> <li>Showing empathy for others</li> <li>Negotiating and demonstrating conflict resolution skills</li> <li>Working respectfully in cross-cultural and diverse teams.</li> </ul>	S1, S3, A1, A2	1, 2
FEDTASK 2 Leadership	<p>Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Creating a collegial environment</li> <li>Showing self-awareness and the ability to self-reflect</li> <li>Inspiring and convincing others</li> <li>Making informed decisions</li> <li>Displaying initiative</li> </ul>	S1, S2, A1	1, 2
FEDTASK 3 Critical Thinking and Creativity	<p>Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Reflecting critically</li> <li>Evaluating ideas, concepts and information</li> <li>Considering alternative perspectives to refine ideas</li> <li>Challenging conventional thinking to clarify concepts</li> <li>Forming creative solutions in problem solving.</li> </ul>	K3, S1, S2, A1, A2	1, 2, 3

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 4 Digital Literacy	<p>Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>Collating, managing, accessing and using digital data securely</li> <li>Receiving and responding to messages in a range of digital media</li> <li>Contributing actively to digital teams and working groups</li> <li>Participating in and benefiting from digital learning opportunities.</li> </ul>	S3, A1, A2	1, 2
FEDTASK 5 Sustainable and Ethical Mindset	<p>Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in:</p> <ul style="list-style-type: none"> <li>Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>Committing to social responsibility as a professional and a citizen</li> <li>Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>Implementing required actions to foster sustainability in their professional and personal life.</li> </ul>	K3	2

**Learning Task and Assessment:**

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S3, A2	A written assignment and / or presentation outlining the application of a technique, data collection and interpretation of results. May include a formal laboratory practical report, data analysis or laboratory note-taking.	Results Communication	20 - 40%
K1, K2, K3, S2, S3, A1, A2	An assignment on the use and understanding of laboratory techniques may include experimental design.	Laboratory Assignments	20 - 40%
K1, K2, K3, S1, S2, S3, A1, A2	Practical use of analytical instrumentation and/or biotechnology techniques, interpretation, reporting and presentation of results	Practical Examination	30 - 50%

**Adopted Reference Style:**

Other (Author-Date (e.g. APA), or Numbered (e.g. IEEE))

Refer to the [library website](#) for more information

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