

Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Advanced Methods in Biotechnology
Unit ID:	SCMOL3010
Credit Points:	15.00
Prerequisite(s):	(SCMOL2001) (SCBCH2001 or SCMIC2001 or SCMOL2010)
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	019909

Description of the Unit:

This unit will introduce students to advanced methods and techniques that are used in contemporary biological and biomedical laboratories. Unit content will be dynamic reflecting the learning needs of students enrolled in biological and biomedical programs and relevant to industry and research. The methods covered in this unit have diverse applications, including research, disease diagnosis, environmental analysis and industry; and can be used in all fields of biomedicine, biotechnology and biology. A major focus of this unit is on the development of understanding of the use of molecular 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.** Understand basic scientific concepts underpinning techniques in advanced biotechnology methods.
- K2.** Describe in detail the use of advanced biotechnological methods and compare/contrast their applicability to conventional/classical methods.
- K3.** Understand the importance of quality control and statistical validity of sampling in the application of advanced techniques to address different real world problems.
- K4.** Determine and justify the use of specific biotechnological methods for use in a range of medical, research and industrial applications.

Skills:

- S1.** Demonstrate proficiency in a variety of contemporary laboratory techniques.
- S2.** Develop scientific problem-solving and investigation skills.
- S3.** Collection, evaluation and interpretation of laboratory data.
- S4.** Analysis of laboratory generated data, including large datasets.
- S5.** Communication of scientific concepts, results and conclusions.

Application of knowledge and skills:

- A1.** Determine appropriate methodological approaches under specific circumstances representative of those encountered in industrial, diagnostic and research applications.
- A2.** Apply problem solving skills and methodological theory to troubleshoot techniques and procedures.
- A3.** Analyse and interpret data and draw appropriate conclusions.

Unit Content:

The unit content will be reviewed annually to ensure content:

- Reflects the learning needs of students enrolled in biological and biomedical programs within the faculty, such as the BSc and tagged degree programs including Veterinary and Wildlife Science, Biomedical Science, and Food and Nutrition.
- 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 however, the topics covered in the unit are likely to cover:

- The development of contemporary biotechnological methods and techniques.
- The current and potential future application of contemporary biotechnological methods and techniques; and why they are used in such applications.
- Conduct laboratory work and data analyses consistent with the current applications of advanced

biotechnological methods.

- Generate, collate, evaluate and interpret 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	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: <ul style="list-style-type: none"> • Using effective verbal and non-verbal communication • Listening for meaning and influencing via active listening • Showing empathy for others • Negotiating and demonstrating conflict resolution skills • Working respectfully in cross-cultural and diverse teams. 	S1, S4, S4, A2	3
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: <ul style="list-style-type: none"> • Creating a collegial environment • Showing self-awareness and the ability to self-reflect • Inspiring and convincing others • Making informed decisions • Displaying initiative 	K2, K4, S1-S5, A1, A2	2, 3

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
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"> • Reflecting critically • Evaluating ideas, concepts and information • Considering alternative perspectives to refine ideas • Challenging conventional thinking to clarify concepts • Forming creative solutions in problem solving. 	K1, K2, K3, S2, S4, S5, A2, A3	1, 3
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"> • Finding, evaluating, managing, curating, organising and sharing digital information • Collating, managing, accessing and using digital data securely • Receiving and responding to messages in a range of digital media • Contributing actively to digital teams and working groups • Participating in and benefiting from digital learning opportunities. 	K1, K2, S2, S4, S5, A2, A3	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"> • Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts • Committing to social responsibility as a professional and a citizen • Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Embracing lifelong, life-wide and life-deep learning to be open to diverse others • Implementing required actions to foster sustainability in their professional and personal life. 	K4, A1	3

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K3, K4, S2, S4, A1, A3	AT1: Assessed Task 1: Assessment of understanding of the practice and application of molecular techniques.	Quizzes (online and/or written)	10 - 30%
K1, K2, S2, S4, S5, A2, A3	AT2: Assessed Task 2: 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 or data analysis.	Written Assignment / Presentation	40 - 60%
K1-K4, S2, S4, S5, A1, A3	AT3: Assessed task 3: Laboratory logbook and professionalism. Proven ability to document experiments and results as well as maintain an orderly lab space.	Laboratory notebook and professionalism	10 - 20%

Adopted Reference Style:

Australian Harvard

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

Fed Cite - [referencing tool](#)