Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	MOLECULAR CELL BIOLOGY
Unit ID:	SCMOL3001
Credit Points:	15.00
Prerequisite(s):	(SCBCH2001)
Co-requisite(s):	Nil
Exclusion(s):	(SCMED2031)
ASCED:	010901

Description of the Unit:
The unit examines the pathways by which cells receive external information and process this into specific biochemical responses. We begin with a survey of different mechanisms of cellular signalling and their roles in `normal` cellular activities and overall homeostasis. A diverse set of cellular processes is studied and the normal control mechanisms highlighted. This is followed by investigation of the dysfunction of signalling mechanisms in several disease states. The unit will also explore the use of advanced recombinant DNA technologies in research and diagnostics. The latest methods for investigating gene and protein function, gene therapy, virus detection and typing, recombinant vaccine production and personalized medicine will be explored.

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:

Knowledge:

K1. Describe the function of a range of cell-cell communication processes.

K2. Describe how signalling events regulate the normal function of the healthy body.

K3. Recognise the role of signalling dysfunction in a range of pathological states.

K4. Explain the molecular basis of a wide range of diagnostic and research techniques.

Skills:

S1. Develop scientific problem solving and investigation skills.

S2. Devise strategies to search for and critically analyse relevant scientific literature.

S3. Demonstrate proficiency in the interpretation of data acquired by molecular biological techniques.

Application of knowledge and skills:

A1. Appraise current scientific problems in industry, medicine and research and devise strategies to solve them.

A2. Critically evaluate and compare approaches to a particular scientific or industrial problem.

Unit Content:

Topics may include:

- Structure and function of eukaryotic cells and organelles review.
- Trafficking between cellular compartments review.
- Cell signalling and signal transduction.
- Advanced regulation of gene expression: RNAi, epigenetics.
- Endocrine control of cellular processes.
- The cell cycle, apoptosis and cell death.
- Pathogenesis associated with dysfunctional states.
- Advanced molecular diagnostics: including high throughput sequencing, transcriptome analysis RT-PCR and microarray technology.
- Proteomics and metabolomics.

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**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be 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, interact and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: • 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.	K1-4, S2,S3	AT2
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: • Creating a collegial environment • Showing self -awareness and the ability to self-reflect • Inspiring and convincing others • Making informed decisions • Displaying initiative	N/A	N/A
FEDTASK 3 Critical Thinking and Creativity	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: • 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, K4, S1, S2, A2 K1,K3,S1,S3	AT1 AT3
FEDTASK 4 Digital Literacy	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: • 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,K3,K4,S2, S3	AT2
FEDTASK 5 Sustainable and Ethical Mindset	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: • 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.	N/A	N/A

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K4, S1, S2, A2	AT-1: Online Quizzes testing the retention, comprehension and application of unit lecture content. Online quizzes testing comprehension of scientific research articles related to unit content explored via tutorial work	Quizzes: Multiple choice, short answer questions and problems requiring application of knowledge (varied question types)	30-50%
K1, K3, S1, S3	AT-2: Comprehension of signalling mechanisms. Examine the detailed molecular effects of selected toxins and medicines on cells, organs and tissues.	Written and/or oral report.	20-30%
K1, K2, K3, K4, A1, A2	AT-3 Students will be examined on their knowledge and synthesis of understanding of all topics throughout semester.	Online Test (varied question types)	30-50%

Alignment to the Minimum Co-Operative Standards (MiCS)

The Minimum Co-Operative Standards (MiCS) are an integral part of the Co-Operative University Model. Seven criteria inform the MiCS alignment at a Course level. Although Units must undertake MiCS mapping, there is NO expectation that Units will meet all seven criteria. The criteria are as follows:

1. Co-design with industry and students
2. Co-develop with industry and students
3. Co-deliver with industry
4. FedTASK alignment
5. Workplace learning and career preparation
6. Authentic assessment
7. Industry-link/Industry facing experience

MiCS Course level reporting highlights how each Course embraces the principles and practices associated with the Co-Operative Model. Evidence of Course alignment with the MiCS, can be captured in the Course Modification Form.

MICS Mapping has been undertaken for this Unit Yes

Date: Apr 14, 2023

Adopted Reference Style:

APA

Refer to the library website for more information

Fed Cite - referencing tool