BIOS 3034 MOLECULAR BIOTECHNOLOGY

Credit Points 10

Legacy Code 301405

Coordinator Mark Jones (https://directory.westernsydney.edu.au/search/name/Mark Jones/)

Description Molecular techniques in cell biology are rapidly developing and offer new solutions to disease mitigation, as well as sustainable solutions to environmental and industrial imperatives. The fundamental cellular processes along with stem cell development, transformation, transfection, cell engineering and re-programming are some of the advanced applications covered in this unit. Students will conduct guided projects investigating the action of hormones, growth factors, morphogens and bio-actives; their receptors and signalling pathways and the cellular responses they trigger. Molecular Biotechnology covers modern techniques in cell screening, cell culture, advanced characterization and experimental approaches enabling dynamic understanding of live microbial, animal and plant cells.

School Science

Discipline Biochemistry and Cell Biology

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) BIOS 2018 OR
BIOS 3027 AND

Equivalent Subjects BIOS 3001 - Advanced Cell Biology

Learning Outcomes

On successful completion of this subject, students should be able to:
1. Critically analyse and statistically evaluate biological data from a range sources.
2. Evaluate biological mechanisms by articulating the principle intra-cellular components controlling microbial, animal and plant cell form and function.
3. Analyse the molecular mechanisms and rate by which cells can be induced to respond to variable stimuli.
4. Apply technical and interpretive skills to modify microbial, plant and animal cell for biotechnology applications.
5. Ethically design and evaluate computational experiments in animal, plant or microbial biology.
6. Propose sustainable molecular biotechnology strategies following cultural, ethical and legal frameworks.

Subject Content

1. Molecular mechanisms controlling microbial, animal and plant cell components, including membranes, organelles, cytoskeleton and the intracellular compartmentalization of molecules and their transport.
2. The interrelationship and responsiveness of cells with their immediate environment including molecular modifications to respond to variable stimuli and rapid change.
3. Cell communication through: receptor-ligand binding and bio-active molecule interactions, molecular modifications and reporter systems of cell signalling molecules and bio-remediation.
4. Cell division and differentiation, adaptation and modification through molecular re-programming, induction of pluripotent stem cells, regulation of cell cycle as well as cell death.
5. Application of advanced cell biology techniques, including skills relevant to microbial, animal and plant cell culture methods.
6. Cell characterisation with techniques including real-time Polymerase Chain Reaction (PCR), hyperspectral and fluorescence characterization and image analysis techniques.
7. Development of professional molecular strategies to modify cells for sustainable environmental and industrial applications and disease control, in the context of cultural, ethical and legal frameworks.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/ Group Task
Critical Review	1,500 words	30	N	Individual
Experiment Report - eNotebook	2,000 words or equivalent	30	N	Individual
Research Proposal	3,500 words	40	N	Individual

Teaching Periods

Spring
Hawkesbury
Composite
Subject Contact Mark Jones (https://directory.westernsydney.edu.au/search/name/Mark Jones/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=BIOS3034_22-SPR_HW_C#subjects)