UNSW Course Outline

BIOC3271 Molecular Cell Biology 2 - 2024

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General Course Information

Course Code : BIOC3271
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Biotechnology and Biomolecular Sciences
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

The discipline of Molecular Cell Biology investigates how cells develop, operate, communicate, construct multicellular organisms, control their activities, and (on occasion) go awry. To study the properties of the molecules that contribute to all these activities, modern researchers employ

concepts and experimental techniques drawn from biochemistry, molecular biology, genetics and cell biology. The course will present an overview of our current understanding of the molecular mechanisms that control cellular processes in health and disease and the techniques that are used to arrive at that understanding. Lectures presented in the course will cover molecular mechanisms of the recognition and interactions between cells, cell growth, intracellular signaling, genome and transcriptome regulation, plasma membrane and cytoskeleton organization, protein and lipid transport, and cellular stress. In addition, lectures on molecular mechanisms of conditions caused by dysregulation of these mechanisms, including growth disorders, cancer, obesity, atherosclerosis, and neurodegenerative disorders will be given. The course will include laboratory classes providing a high level of hands-on experience in experiment planning, laboratory techniques used in the fields of cell biology and biomedical research, and data analysis. A structured environment and a high level of peer interactions make these classes ideal for students with and without previous experience.

This course is run in parallel with an advanced version, BIOC3671, which includes a research project that students perform in a laboratory in the School of Biotechnology and Biomolecular Sciences instead of attending the weekly laboratory classes. The advanced course is designed for students who plan to pursue research careers in molecular cell biology or related disciplines.

Course Aims

The overall aim of the course is to provide a solid foundation in eukaryotic molecular cell biology and to demonstrate techniques used to study cells and their functional components. The knowledge and experience gained in the course will prepare you for careers in research, industry and other areas where solving problems involving eukaryotic cells is important, including careers in biomedical research aimed at improving understanding of human diseases and development of new therapeutics.

Relationship to Other Courses

The lecture programs for BIOC3271 Molecular Cell Biology 2 and BIOC3671 Molecular Cell Biology 2 (Advanced) are ‘integrated’ such that lectures are common to the two courses. The program of the practical work is different. BIOC3271 students have practical classes and discussion classes, while BIOC3671 students perform a short project with the help of self-identified BABS faculty members. BIOC3671 students are expected to write a review article / report about their project and present it at the final practical classes to BIOC3271 students.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe the complexity of eukaryotic cells and cellular processes in healthy and diseased cells.
CLO2 : Analyse and interpret experimental results using knowledge of theory and practical methods in cell biology.
CLO3 : Communicate and discuss current strategies in scholarly literature for solving cell biological problems in written and oral formats.
CLO4 : Prepare an experimental research plan for a novel experiment by locating and evaluating literature on relevant experimental techniques.

Course Learning Outcomes	Assessment Item
CLO1 : Describe the complexity of eukaryotic cells and cellular processes in healthy and diseased cells.	• Mid-Term Test • Final Exam
CLO2 : Analyse and interpret experimental results using knowledge of theory and practical methods in cell biology.	• Experimental Plan
CLO3 : Communicate and discuss current strategies in scholarly literature for solving cell biological problems in written and oral formats.	• Discussion Classes • Mid-Term Test • Experimental Plan • Final Exam
CLO4 : Prepare an experimental research plan for a novel experiment by locating and evaluating literature on relevant experimental techniques.	• Experimental Plan

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Learning and Teaching in this course

The teaching in Molecular Cell Biology requires the active engagement of students in the learning process and reflects the active enquiry process underlying scientific research and discovery. Online lectures and practical classes are complemented by online materials provided at the course website to allow efficient revision and self-directed learning.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Mid-Term Test Assessment Format: Individual	30%	Start Date: 12/07/2024 02:00 PM Due Date: 12/07/2024 04:00 PM
Experimental Plan Assessment Format: Individual Short Extension: Yes (7 days)	20%	Start Date: 24/06/2024 12:00 PM Due Date: 30/07/2024 11:59 PM
Discussion Classes Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: 29/07 (1-2 pm), 31/07 (5-6 pm), 2/08 (12-1 pm, 2-6 pm)
Final Exam Assessment Format: Individual	30%	Due Date: during the exam period

Assessment Details

Mid-Term Test

Assessment Overview

This assessment will test your knowledge of the lecture material. The test is expected to contain five essay questions covering lectures given in week 1 - week 5. Typically, you will be asked to answer all questions. Questions typically contain sub-questions. You will have 2 hours to answer the questions. The test is expected to take place in week 7. You will receive marks for each topic to help guide your revision for the Final Exam two weeks after delivery. Further feedback will be provided verbally at the final practical class in week 10.

Course Learning Outcomes

- CLO1 : Describe the complexity of eukaryotic cells and cellular processes in healthy and diseased cells.
- CLO3 : Communicate and discuss current strategies in scholarly literature for solving cell biological problems in written and oral formats.

Assessment Length

2 hours

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Experimental Plan

Assessment Overview

You will write a plan for two experiments to investigate a chosen hypothesis consisting of Introduction, Materials and Methods, Expected Results and their Analysis, Discussion, and References. For the first experiment, you will need to include techniques studied in the BIOC3271 laboratory classes.

For the second experiment, you will be asked to design an experimental plan by searching the literature and proposing new techniques. This plan is expected to be four pages long excluding references, written in font size 12 Times New Roman with references organized in the Journal of Cell Biology style. You will have five weeks to work on the report, which is expected to be submitted in week 10. Feedback will be provided in the form of a marked rubric and individualised comments if appropriate.

Course Learning Outcomes

- CLO2 : Analyse and interpret experimental results using knowledge of theory and practical methods in cell biology.
- CLO3 : Communicate and discuss current strategies in scholarly literature for solving cell biological problems in written and oral formats.
- CLO4 : Prepare an experimental research plan for a novel experiment by locating and evaluating literature on relevant experimental techniques.

Assessment Length

4 pages

Submission notes

submit as a pdf or Word document via Moodle

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Discussion Classes

Assessment Overview

You will be asked to present an assigned article to your peers. You will be expected to respond to questions from the audience using information from the article and knowledge gained from the course lectures and practical classes. Your presentation is expected to be 10 min long and contain up to 10 slides. The presentation will contribute 10% to the final mark. The presentations

will be marked by your peers, who will provide feedback in the form of a marked rubric and individualised comments.

You will be expected to listen to the presentations of all other BIOC3271 and BIOC3671 students, write 3-6 sentences with feedback for each presentation with suggestions on how the presentations can be improved, and give a mark for each presentation. This activity will contribute 10% to the final mark. You will receive feedback in the form of a marked rubric.

The presentations are expected to be scheduled in week 10 during the lectures and practical class.

Course Learning Outcomes

- CLO3 : Communicate and discuss current strategies in scholarly literature for solving cell biological problems in written and oral formats.

Assessment Length

10 min, 10 slides

Submission notes

Oral presentation via Teams or in person. Submit a pdf of the presentation via Moodle.

Assignment submission Turnitin type

Not Applicable

Final Exam

Assessment Overview

This assessment will test your knowledge of the lecture material. The exam is expected to contain five essay questions covering lectures given in week 5 - week 9. Typically, you will be asked to answer all questions. Questions typically contain sub-questions. You will have 2 hours to answer the questions. The exam will take place in the formal examination period. You will receive marks for each topic. Further feedback will be provided verbally upon request.

Course Learning Outcomes

- CLO1 : Describe the complexity of eukaryotic cells and cellular processes in healthy and diseased cells.
- CLO3 : Communicate and discuss current strategies in scholarly literature for solving cell biological problems in written and oral formats.

Assessment Length

2 hours

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

General Assessment Information

Grading Basis

Standard

Requirements to pass course

Achieve a composite mark of at least 50 out of 100

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 27 May - 2 June	Lecture	Introduction (Vladimir Sytnyk)
	Lecture	Cell Adhesion and Recognition (Vladimir Sytnyk)
	Lecture	Neuronal synapse (Vladimir Sytnyk)
Week 2 : 3 June - 9 June	Lecture	Immunological synapse (Tatyana Chtanova)
	Lecture	Mammalian Genome (Michael Janitz)
	Lecture	Transcriptome Regulation (Michael Janitz)
	Laboratory	Functional genomics (Michael Janitz, via Teams)
Week 3 : 10 June - 16 June	Lecture	Cytoskeleton and human disease 1 (Frances Byrne)
	Lecture	Cytoskeleton and human disease 2 (Frances Byrne)
	Laboratory	Cell adhesion (Vladimir Sytnyk)
Week 4 : 17 June - 23 June	Lecture	Cellular Stress 1 (Antony Cooper)
	Lecture	Cellular Stress 2 (Antony Cooper)
	Lecture	Cellular Stress 3 (Antony Cooper)
	Laboratory	Protein analysis I (Vladimir Sytnyk)
Week 5 : 24 June - 30 June	Lecture	Cell Biology of EGFR signaling (Vladimir Sytnyk)
	Lecture	Cell Adhesion and Signaling (Vladimir Sytnyk)
	Lecture	Phase separation in cell biology (John Mattick)
	Laboratory	Protein analysis II (Vladimir Sytnyk)
Week 7 : 8 July - 14 July	Lecture	Cell biology of development (Sally Dunwoodie)
	Lecture	Cell biology of development (Gavin Chapman)
	Lecture	ER to Golgi Transport (Andrew J. Brown)
	Assessment	Mid-term exam
Week 8 : 15 July - 21 July	Lecture	Molecular Biology of Ageing (Lindsay Wu)
	Lecture	Maintenance of glucose homeostasis (Lindsay Wu)
	Lecture	Membranes/lipid RAFTs (Andrew J. Brown)
	Laboratory	Protein interactions (Vladimir Sytnyk)
Week 9 : 22 July - 28 July	Lecture	RNA sensing (Cecile King)
	Lecture	Cancer (Kyle Hoehn)
	Lecture	Cancer (Frances Byrne)

	Laboratory	Fluorescent microscopy (Vladimir Sytnyk)
Week 10 : 29 July - 4 August	Group Activity	Discussion classes

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

The lectures are scheduled on Mondays (1 - 2 pm), Wednesdays (5 - 6 pm), and Fridays (12 - 1 pm).

Practical classes are schedules on Fridays, 2 - 6 pm starting from week 2.

Discussion classes are scheduled during the lectures and practical class in week 10.

Course Resources

Prescribed Resources

Molecular Biology of the Cell 6e (Alberts Bruce)

Molecular Cell Biology 8e International (Lodish Harvey Berk Arnold)

Print:

https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9780393884852

https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9781319365486

Digital:

https://unswbookshop.vitalsource.com/products/-v9780393884647

https://unswbookshop.vitalsource.com/products/-v9781319383602

Recommended Resources

The online Bookshelf of the US National Center for Biotechnology Information: http://www.ncbi.nlm.nih.gov/books

PubMed Central (PMC) - the U.S. National Institutes of Health (NIH) free digital archive of

biomedical and life sciences journal literature. http://www.ncbi.nlm.nih.gov/pmc/

iBiology: http://www.ibiology.org/

Neuronline: http://neuronline.sfn.org

Additional Costs

Computer and internet access to online course resources.

Students bring and wear their own lab coat and safety glasses during the practical classes.

Course Evaluation and Development

Student evaluative feedback from UNSW's myExperience process is gathered each year, and the staff involved in teaching will review all aspects of the course at the end of the session. Student feedback is valued and forms part of the basis for continual improvement.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Vladimir Sytnyk					No	Yes

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as

early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

Important note: UNSW has a "fit to sit/submit" rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines