BIOL/BCHM253
Cell Biology 1

0.125 EFTS, 15 Points
Terms 1 and 2, Semester 1

Whakamahuki / Description

The course will cover membrane structure, principles of membrane transport and the electrical properties of membranes, intracellular compartments and protein sorting, principles of the cytoskeleton, and the cell cycle and apoptosis. The primary aim of the course is to discuss the principles of cell biology at the level of the individual cell. The topics covered will give students a comprehensive grounding in cells as single entities. This will prepare students for the 3rd year cell biology course that will consider cells at a more advanced level, looking at cells in their social context and how they interact with other cells.

As all cells operate using the same basic machinery, experimental work on cells from "simpler" organisms has revolutionised our understanding of human biology and disease. Studies on the control of the cell cycle in yeast, for example have taught us much about human cancer. The use of such model organisms, which also include the wild mustard *Arabidopsis*, nematode worms and mice, is crucial in biological research and examples of a key process in cell biology from these organisms will be included. The genomes of these organisms have been sequenced, thus we know the molecular make-up of these cells. Genetics and biochemistry can tell us how various parts function individually and a key task for cell biologists is to understand how all of these interact together to form a dynamic living entity.

Āhuatanga Taura / Graduate Profile

This course will provide students with an opportunity to develop these UC Graduate Attributes (www.canterbury.ac.nz/study/graduate-profile/students/what-are-the-graduate-attributes/):

- GP1 Critically competent in a core academic discipline.
- GP2 Employable, innovative and enterprising.
- GP3 Biculturally competent and confident: K3 Traditional and contemporary realities of Māori society; K5 Process of colonisation and globalisation.

Hua ako / Course learning outcomes and Aromatawai / Associated assessment

At the end of the course, students are expected to be able to:

- Gain a greater appreciation of the internal workings of the cell *(assessment tasks: in term test and final exam). GP1*
- Appreciate the sophistication of mechanisms that have evolved to enable the workings of a cell, but at the same time be mindful that we still have much to discover *(assessment tasks: laboratory assignments and final exam). GP1*
- Become familiar with modern cell biology experimental techniques *(assessment tasks: laboratory assignments). GP1 and GP2*
- Understand the use of "model organisms" - appreciate how experimental findings made on seemingly "lower organisms" such as nematodes and yeast can lead to a better understanding of the complexity of human biology and disease *(assessment tasks: laboratory assignments, in-term test and final exam). GP1 and GP3 (K3 and K5).*
- Appreciate how research in cell biology leads to a better understanding of disease and an understanding of the factors that are pertinent with respect to Māori health and the impact of colonisation. GP1 and GP3 (K5)
- Gain an understanding of both the theory and the practice of cell biology which will make me attractive to potential employers *(assessment tasks: laboratory assignments, in-term test and final exam). GP1 and GP2*

Pūkenga ngaio **/ Transferable skills**
The following skills are developed in this course:

- Synthesise information. In everyday life and in many job situations you will be required to read information from different sources, generate your own understanding and develop your own viewpoint. *Your understanding of the topics covered in the course will be achieved by reading information obtained from lectures, labs and assigned readings from textbooks and papers. In lectures we will discuss recent research papers and this will develop your abilities to identify the essential elements of research outputs - you will use these skills in report writing. GP1 and GP2*
- Collect experimental data. Important for research and in governmental and nongovernmental organizations. *We will conduct research activities in the lab to provide both the real-world context for lectures and to develop hands-on skills in data collection. GP1 and GP3*
- Analyse data. Important for research, as well as in a number of private-sector organizations. *This skill will be further developed when we assist you to analyse the data we generate in the lab. GP1 and GP3*
- Write a report on findings. Clear written communication is essential for most professional careers. *We will provide you with guidelines on the elements of successful reports. GP1 and GP3*

Prerequisites

BIOL111 and 15 pts of 100-level CHEM
Recommended preparation: 30 points of CHEM at 100-level

2022 Course Evaluation

(Scoring used - 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree)

Question 1 - The materials provided helped me to understand what was required to succeed in this course: **4.43**
Question 2 - The organisation of this course helped me learn: **4.55**
Question 3 - I found the workload was appropriate to the level of the course: **4.51**
Question 4 - I found the assessments thoughout the semester appropriate for the course: **4.46**
Question 5 - When I sought feedback on my assessments, I found it helpful: **4.27**

Selected Comments:
• Everything very easy to absorb and very well organised which made learning the content in this course interesting and fun.
• Really enjoyable course
• Perfect workload, I was engaged in the course throughout the semester, but was at no point overwhelmed
• Feedback was given on tests and lab quizzes individually which is extremely helpful and allows us to improve on our answers, something which is often not done in other courses.
• This was one of my favourite courses and all the lecturers taught in a very understandable way
• Some of the lab material should have been covered more in lectures/discussed more in labs (AG – this comment is noted and I will make an effort to rectify this in 2023).

Aromatawai / Assessment

Lab assignments	30%
In-Term Test (45 min)	18% on lectures 1-6; this will be held one evening in the fourth/fifth week of term 1, and at a time and location to be announced.
Final Exam (2 h)	52% on lectures 7-24; time and location to be announced.

Electronic Distribution of Course Material

All course material will be distributed on Learn. This will include

* course notices
* lecture handouts that will be available before the lectures.
* PDFs of lectures
* audio recordings of lectures
* laboratory results

Textbook

The course text is:
Alberts B *et al*. (2022) Molecular Biology of the Cell, 7th edition, Garland Science.

This is an **excellent** textbook on cell biology – it is clearly written, comprehensive and authoritative. It also has very good figures which will be used extensively to illustrate the

PowerPoint lectures in the course. It covers all aspects of the course, and includes many topics that there will not be time to mention at all. It is also used in the third year course in cell biology, BIOL351. It is available in soft-back from the University Bookshop at about $170.

If you are unable to purchase your own copy, new or second-hand, some copies of the text are available on 3 hour Restricted Loan. Copies of the 5th and 6th editions might also be available second-hand.

Lecturers in the course will give references for additional recommended reading (including references to journal articles).

Pūkenga / Teaching staff

Course Coordinator

Ashley Garrill, room 420, School of Biological Sciences
email: ashley.garrill@canterbury.ac.nz

Lecture contacts:

Ashley Garrill, contact details as above

Vanessa Morris, room 422, School of Biological Sciences
email: vanessa.morris@canterbury.ac.nz

Claudia Meisrimler, room 426, School of Biological Sciences
email: claudia.meisrimler@canterbury.ac.nz

Christoph Goebl, room 418, School of Biological Sciences
email: christoph.goebl@canterbury.ac.nz

Gretel Major, room 519, School of Biological Sciences
email: Gretel.major@canterbury.ac.nz

Lab contacts:

Ashley Garrill - contact details as above
Reijel Gardiner, Biological Sciences building
email: reijel.gardiner@canterbury.ac.nz

Wātaka / Timetable

Lectures

There are 2 lectures per week for this course in terms 1 and 2. The times and locations for these will be notified on My Timetable, which you should check regularly for any last minute changes.

Schedule

1 – 6	Ashley Garrill	The Cytoskeleton
7 – 12	Vanessa Morris and Gretel Major	Cell Signalling/The Cell Cycle
13 – 15	Christoph Goebl	Immunology, Disease, Cell death
16 – 18	Claudia Meisrimler	Cell structure and function, Plant cells
19 – 24	Ashley Garrill	Organelles, Vesicle Transport, Membranes

Laboratory classes

The labs will start in term 2.

There are different streams (again the dates for these will be available on My Timetable. Prior to the labs starting you will need to allocate to one of these streams. (you'll be informed when you can do this later in term 1). Should you not be able to come to a lab on a particular day, please contact Ashley to discuss whether you can attend the lab in a different stream. Depending on stream sizes, this may or may not be possible.

Schedule

Lab	*Topic*	*Related lectures*
1	Microscopy	--------
2	Streaming in *Nitella*	Cytoskeleton
3	Water transport in onion cells	Membrane biochemistry
4	Cell cycle	Cell cycle
5a	Immunolabelling MTs	Cytoskeleton
5b	Observation of MTs from Lab 5	Cytoskeleton

Aromatawai / Laboratory Assessment

Assessment for the labs will comprise open-book quizzes, each worth 6%. These will be posted onto Learn after the lab and will comprise a series of questions concerning the methods and results from the practical class. You will be expected to provide short answers for these questions.

Together these laboratory assessments contribute 30% to the overall mark for the course. Unless otherwise indicated, laboratory assessments are due by 5:00 pm, one week after the last experiment of any laboratory exercise. Assessments should be submitted via Learn and should be checked with Turnitin.

RULES, REGULATIONS, AND WHAT TO DO WHEN THINGS GO WRONG
[updated March 2023]

If in doubt: ASK! The course coordinator is happy to answer questions. All staff involved in the course are available for advice on specific issues.

What do I do if I have to miss a test/exam or if my performance was impaired?
In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. This means you must attend all class activities (labs, tutorials, fieldtrips) and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons) and if this has been approved by your course coordinator.

If you feel that illness, injury, bereavement or other extenuating circumstances beyond your control prevented you from completing a test/exam worth 10% or more of the total course assessment, or if these circumstances affected your performance in such assessments, you should apply for Special Consideration. Applications for Special Consideration should be submitted via the Special Consideration website http://www.canterbury.ac.nz/study/special-consideration/ *within five working days* of the assessment or its due date. You should also notify the course coordinator. If you apply for Special Consideration because of medical reasons, you should visit a doctor within a reasonable timeframe (application form available on the website above or from the Student Health Centre).

The Special Consideration provisions are intended to assist students who have covered the work of a course but have been prevented by illness or other critical circumstances from demonstrating their mastery of the material or skills at the time of a text/exam – they do not excuse you from doing the test/exam within a reasonable time agreed with the course coordinator.

What do I do if I have to miss a quiz or assignment or if I need an extension?
You cannot apply for Special Consideration if you miss an assessment that is not a test/exam, such as a quiz, lab report, essay, literature review or other assignment, or if the test/exam is worth less than 10% or more of the total course assessment. If this happens or if you need an extension because of illness, injury, bereavement or other extenuating circumstances beyond your control, please contact the course coordinator and arrange an alternate activity and/or submission date. You should also do this if you have to miss a laboratory, tutorial or field trip.

What are other valid reasons to miss an assessment or mandatory course activity?
The Special Considerations policy (https://www.canterbury.ac.nz/about/governance/ucpolicy/student/special-consideration-procedures-and-guidelines/) outlines only a few kinds of activities that UC considers valid reasons for missing an assessment or mandatory course activity other than those outlined above. These include involvement in international or national representative sport or cultural groups. Holiday trips, birthday parties, weddings, work-related commitments etc. are not given special status in this

University policy. Please contact your course coordinator to ask for an alternate activity and/or submission date if you are eligible.

Special Consideration for late discontinuation of a course
Students prevented by extenuating circumstances from completing the course after the final date for withdrawing, may apply for Special Consideration for late discontinuation of the course. Applications must be submitted via http://www.canterbury.ac.nz/study/special-consideration/ no later than five working days after the examination period has finished.

Academic Integrity
It is the responsibility of each student to be familiar with the definitions, policies and procedures concerning academic misconduct/dishonest behaviour. Instances of academic misconduct will be dealt with in a serious and appropriate manner. Students should refer to:
https://www.canterbury.ac.nz/about/ako/academic-quality/academic-integrity/

Plagiarism
It is essential that you are aware that plagiarism is considered a very serious offence by the academic community, the University and the School of Biological Sciences. Plagiarism is defined as taking content from another work or author and presenting it, without attribution, as if it is your own work. Content here includes text (sentences or major parts of sentences), display items (graphs and tables), and overall structure (the detailed sequence of ideas). Plagiarism includes:

- re-use of previous assignments (even if each individual sentence has been rephrased to say the same thing in different words, if the overall structure is re-used).
- copying of another student's work (with or without their consent).
- the unreferenced use of published material or material from the internet, e.g. cutting and pasting of paragraphs or pages into an essay.
- the generation of text using artificial intelligence technology without disclosure and when it is not intended to be part of an assignment.

For most pieces of in-term assessment you will be given information concerning the use of direct and indirect quotes from previously published work. If you have any doubt about the appropriate use of published material, please speak with an academic staff member. If you are unsure what plagiarism is, seek advice.

It is a School policy that courses will likely that you submit work electronically for subsequent analysis of originality using *Turnitin*. Students agree that by taking courses in BIOL, assessments may be submitted to Turnitin.com for textual similarity review. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use as posted on the Turnitin.com site.

Artificial Intelligence (AI) tools: Some UC assessments permit the use of Artificial Intelligence (AI) tools. Please read each assessment's guidelines carefully so you know what AI use is permitted or not, and ensure that you follow the guidance on both usage and how to declare any permitted AI usage in your assignment (e.g., do you explain the AI tools and procedures employed in the assessment Methodology section, in the Acknowledgements, or in another manner). If AI use is not expressly permitted in an

assessment, assume is it not allowed. If at all unsure regards AI use and documentation, please ask your course teaching staff.

Where do I hand in assignments and then collect them once marked?
All assignments should be submitted as directed by the course coordinator. Typically, this will be electronically via Learn for on-line grading and for analysis in *Turnitin*. If a hard copy is requested, assignments should be placed in the designated collection boxes in the foyer of the 2nd floor of the School of Biological Sciences (Julius von Haast building, at the top of the stairs). All assignments must be accompanied by a cover sheet signed by you stating that the submitted work is not plagiarised. Cover sheets are available on top of the collection boxes, or you can download one from the Biology website (http://www.canterbury.ac.nz/media/documents/science-documents/assignment-coversheet.pdf).

Marked assignments will be returned through Learn or, if in hard copy, can be collected from the School of Biological Sciences reception, unless directed otherwise by the course coordinator. Teaching staff will endeavour to return work as soon as possible, and should contact you if there are likely to be any delays that will prevent return within the maximum 4-week timeframe.

What if I can't get it finished in time?
Reports and assignments should be handed in on time. Extensions may be granted if you have a valid reason (see above). If you require an extension, you should request one from the course coordinator (or the lecturer responsible for marking the work), with as much notice as possible. Please do this BEFORE the deadline for the assignment. If you have been given an extension and you have been asked to submit a hard-copy of your work, you should hand the work DIRECTLY to the course coordinator (do not put it in the drop box as it may not be cleared after the due date).
If an extension has not been granted:

- work handed in within 1 hour of the deadline: penalty of up to 5 percentage points of the mark for the assignment (e.g., a mark of 75% might be reduced to 70%).
- work handed in 1 – 24 hours after the deadline: penalty of 10 percentage points of the mark for the assignment (e.g., a mark of 75% is reduced to 65%).
- work handed in 1 – 7 days after the deadline: penalty of 15 percentage points of the mark for the assignment (e.g., a mark of 75% is reduced to 60%).
- work handed in more than 7 days after the deadline will not be marked or earn credit.

What if I have written more than the word or page limit?
If there is a word limit on an assignment, it is usually there to stop you doing too much work and to encourage you to write succinctly. You can be up to 10% over without too much worry, but if the length increases beyond that your mark may suffer due to failure to follow the requirements. If you find yourself way over the word limit talk to the lecturer concerned about how to get your assignment to an acceptable length. Unless specifically advised that there is flexibility, you must adhere to the word limit indicated.

What if I fail part of the course?
In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. This means you must attend all class activities and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons). A student must attain an average score of at least 40% for in-course assessments (e.g. assignments, reports, quizzes) and an average score of at least 40% in the exam and/or tests, AND score at least 50% overall for the course, to be awarded a passing grade. See the course outlines for clarification of the assessment items included in each category and ask the coordinator if you are still unsure.

What's the best way to give feedback?
We welcome constructive feedback at all times – help us to make this a valuable course for you. We endeavour to remain approachable at all times. If you would rather give feedback anonymously, please use the online course survey or talk to lab demonstrators, or your class rep (who will all report back to the staff-student liaison committee that includes a representative from each of the undergraduate classes). Class representatives will be selected from each class at the start of course.

What's the best way to complain?
If you feel you have not been fairly treated during this course, please raise the issue with the lecturer or course coordinator in the first instance. Other avenues include your class rep., who can raise issues anonymously, or the UCSA education coordinator.
Grading

A+	90% or above
A	85 – 90
A-	80 – 84
B+	75 – 79
B	70 – 74
B-	65 – 69
C+	60 – 64
C	55 – 59
C-	50 – 54

A restricted pass (R) may be awarded to those who are close to a pass (i.e. an overall score of 48-49.9%) AND who have achieved at least a 40% overall score in both in-course assessment and tests/exams. If an R grade is awarded you gain credit for the course but cannot continue into papers that require this course as a pre-requisite. NB. The R grade is only available at 100 and 200 level - it cannot be awarded for third year papers.

Failing grades: D 40-49 E 0–39