

## **BCHM381: Biochemical Techniques**

0.125 EFTS    15 Points  
Semester 2

### **Course description | Whakamahuki**

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The goals of this course are to introduce and discuss the methodology and principles involved in current biochemical research, to develop skills in the analysis of current biochemical data and in the communication of biochemical issues.

The course will give you experience in the design and execution of a research project, how to construct a scientific hypothesis, and how to test it. During the course you will generate data and analyse what it means, particularly in the context of published work.

This course is recommended to complement BCHM 301 and BCHM 302, and for all those interested in learning about modern experimental techniques in Biochemistry. BCHM 381 is required for a BCHM Hons or MSc degree.

### **Course coordinator | Kairuruku Akoranga**

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**Grant Pearce**, Julius von Haast 624, School of Biological Sciences (SBS),  
[grant.pearce@canterbury.ac.nz](mailto:grant.pearce@canterbury.ac.nz)

### **Lecturers | Pūkenga**

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Grant Pearce, Julius von Haast 418, School of Biological Sciences, [grant.pearce@canterbury.ac.nz](mailto:grant.pearce@canterbury.ac.nz)

Steven Gieseg, West 754, School of Biological Sciences, [steven.gieseg@canterbury.ac.nz](mailto:steven.gieseg@canterbury.ac.nz)

Ren Dobson, Julius von Haast 424, School of Biological Sciences, [renwick.dobson@canterbury.ac.nz](mailto:renwick.dobson@canterbury.ac.nz)

Vanessa Morris, Julius von Haast 422, School of Biological Sciences,  
[vanessa.morris@canterbury.ac.nz](mailto:vanessa.morris@canterbury.ac.nz)

### **Graduate Profile | Āhuratanga Taura**

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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/](http://www.canterbury.ac.nz/study/graduate-profile/students/what-are-the-graduate-attributes/)):  
Graduate Profile (GP) 1. Critically competent in the core academic discipline; 2. Employable, innovative and enterprising; 3. Bi-cultural confidence and competence; 5. Globally aware.

### **Intended Learning Outcomes | Hua Akoranga and Associated Assessment | Aromatawai**

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As a student in this course, I will develop:

- Knowledge in some modern techniques in biochemistry, such as would be used in modern research laboratories
- Proficiency in the capability to read and critically interpret published research.

- The ability to analyse and critically interpret experimental data, and to present experimental results in the context of published work.
- Skills in the verbal and written presentation of scientific ideas.
- Experience in the design and execution of a research project, how to construct a scientific hypothesis, and how to test it.

## **Transferable Skills Register | Pūkenga Ngaio**

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As a student in this course, I will develop the following skills:

- *Analysis of biochemical data.* There will also be the opportunity to gain experience in carrying out some of these experiments and using the equipment.
- *Scientific writing.* Scientists need to be able to share their results with other scientists. This is often in the form of manuscripts that are submitted to journals, and undergo peer review, in which other scientists judge the rigour of the science presented.
- *Critical synthesis of information.* In everyday life and in many job situations you will be required to read information from different sources, construct your own understanding and shape your own viewpoint. In order to provide a context for your own research, you need to be able to find out what other research has been done in the field.
- *Presentation of research.* In most careers in science the ability to present findings clearly in verbal form is likely to be critical. Clear written and oral communication is essential for most professional careers.

## **Timetable | Wātaka**

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A 1 hour tutorial and 4 hour lab sessions is scheduled each week during term 3. Attendance at these sessions is mandatory.

For the project in term 4, you will carry out 20 hours of lab work at a time suitable for your research team and supervisor.

If you have missed a laboratory due to illness, you **must contact the course coordinator as soon as possible**. If you miss one or two laboratories then a **medical note** may be required. In exceptional circumstances, and on presentation of satisfactory written evidence, other reasons (eg. bereavement) for missing a lab might be accepted. Students that miss a lab will be required to undertake alternative assessment for the lab. If you miss a lab assessments or consider that your performance in completing such work was impaired by illness or injury or bereavement or any other critical circumstance then you must apply for special consideration (see course outline & course coordinator).

## Assessment | Aromatawai

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### **Project 1: Core skills (lab in week 1)**

*In this lab you will demonstrate the background skills needed to be a biochemist.*

Assessment (15%): Lab skills test (5%) Lab report (10%)

Skills: Designing an experiment, generation and analysis of data, scientific communication, ability to provide feedback

### **Project 2: Lipoprotein purification and analysis (labs in weeks 2-3)**

*In this lab you will purify low density lipoprotein from blood and analyze the cholesterol and vitamin E concentrations.*

Assessment (15%): Lab report

Skills: Carrying out written protocols, generation and analysis of data, scientific communication

### **Project 3: Purification of GFP (labs in weeks 4-5)**

*For this project we will purify GFP*

Assessment (20%): Lab report (15%), feedback on others (5%)

Skills: Carrying out written protocols, designing an experiment, generation and analysis of data, written scientific communication, ability to provide feedback.

### **Project 4: Visualisation and introduction to GFP variants (week 6)**

*For this project we will purify different GFP variants and use structural visualization tools to check the locations of the mutations*

Assessment (10%): Literature review and introduction section

Skills: Designing an experiment, verbal and written scientific communication.

### **Project 5: Characterisation of GFP variants (labs in weeks 7-12)**

*This project will involve characterization of the proteins you have just purified using modern biochemical techniques.*

Assessment (40%): lab report (30%), verbal presentation of results (10%)

Skills: Carrying out written protocols, designing an experiment, generation and analysis of data, verbal and written scientific communication.

## 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.

### 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