

# General Course Information



## BCHM 222 BIOCHEMISTRY B Metabolism; the reactions of molecules in cells

Second Semester 2011  
0.125 EFTS 15 Points

### Prerequisites

BCHM 221, BIOL 111 and CHEM 112 (or CHEM115)

### Description

This course aims to communicate the fundamental principles governing the energy generating pathways within the cell. The major emphasis will be on carbohydrate metabolism and mitochondrial electron transport chain. Unlike BCHM221 this course will focus on biochemical systems and the functioning of their individual components.

BCHM222 is a prerequisite for several courses in Biochemistry, Chemistry and Biology and, in particular, it leads directly on to BCHM301. Students wishing to major in biochemistry must pass BCHM202, BCHM212, BCHM221, BCHM222, BCHM281 and at least one of BCHM206 and BCHM253. Those who wish to learn more – including material at the frontiers of Biochemical Research – can continue in BCHM301, BCHM381 and BCHM302.

BCHM222 runs in semester two. It counts 15 points towards a Bachelor of Science degree. It is required to major in biochemistry and preferably it is taken in conjunction with other 200-level biochemistry, biology and chemistry courses.

### Course Co-ordinator

A/Prof Steven Gieseg, School of Biological Sciences, Room 433B,  
Phone ext 7049, Email: Steven.Gieseg@canterbury.ac.nz  
*Email me if you have any queries about the course.*

### SCHEDULE

**Lectures:** Monday, Tuesday, 1.10 to 2 pm, **(venue to be confirmed on the web).**

**Tutorial times:** Wed 9 to 9:50 am: **(venue to be confirmed).**  
Wed 10 to 10:50 am: **(venue to be confirmed).**

### Lecturers:

Term 3 A/Prof Matthew Perugini Von Haast Building, Rm 368 ext 7029  
Email: perugini@unimelb.edu.au

Term 3 will begin with an introduction to enzymes and the general concepts of enzyme-driven catabolic and anabolic metabolism in mammalian cells. The metabolism of glucose will then be described in detail, including the metabolic pathways of *glycolysis*, *gluconeogenesis*, *glycogenolysis*, *glycogenesis*, and the *citric acid cycle*. Focus will then shift to the regulation of carbohydrate metabolism, beginning with examples of allosteric control and tissue-specificity, followed by a discussion of covalent regulation during the fasting and fed states. Throughout term 3, specific examples of metabolic diseases will be introduced to consolidate and develop knowledge of the key concepts. The knowledge gained will underpin and synergise with the topics introduced in term 4 of the course.

Term 4 A/Prof Steven Gieseg Rm 433B, Von Haast Building, Phone ext 7049,  
Email: Steven.Gieseg@canterbury.ac.nz

In term 4 we will examine the process of electron transport in the mitochondria and how this is coupled to the generation of ATP. We will look in detail at each of the major electron transport complexes and the ATP generating nano-machine within the mitochondria. A

consequence of electron transport is free radical generation within the cell. We will examine how these radicals are generated and how the cell neutralises these toxic compounds. The mitochondrial is a key part of the controlled cell death mechanism known as apoptosis. We will examine how the mitochondria is involved in cell death before finishing the series examining ATP generation by electron transport in chloroplasts.

## Tutorials

These are workshops where the assignments work will be discussed and set. It will also be an opportunity to further discuss any issue from lectures and ask questions relating to the lecture material. Timing and location of the tutorials will be confirmed and communicated at lectures and on Learn.

**Assignments:** This will take the form of written reports on topics set by the lecturers during the term. The topics will be on aspects of cell metabolism and designed to expand and test the students skills in scholarship based research. This will require reading and researching material introduced during lectures.

## Workload

Students should note that the Science Faculty recommends approximately 3.2 hours of additional study for each hour of lecture/workshop contact time at the 200-level.

## Assessment

- Final Examination: 60%
- Assignments: Term 3 20% Work set by A/Prof Perugini  
Term 4 20% Work set by A/Prof Giese

**Exam:** Three hours; details to be advised.

## REQUIRED READING

Garrett and Grisham *Biochemistry*: 4<sup>th</sup> (or 3<sup>rd</sup>) edition

## OTHER USEFUL TEXTBOOKS

Nelson and Cox *Lehninger Principles of Biochemistry*; 5<sup>th</sup> edition

Voet and Voet *Biochemistry* (2<sup>nd</sup> edition)

Hames and Hooper *Instant Notes Biochemistry* (2<sup>nd</sup> edition)

Alberts *et al.*, *Molecular Biology of the Cell* (4<sup>th</sup> edition)

Buchanan *et al.*, *Biochemistry and Molecular Biology of Plants*

Horton *et al* *Principles of Biochemistry*

Zubay *Biochemistry* (4<sup>th</sup> edition)

Stryer *Biochemistry* (4<sup>th</sup> edition),

Mathews and Van Holde *Biochemistry* (3<sup>rd</sup> edition)

Lodish *et al* *Molecular Cell Biology* (3<sup>rd</sup> edition)

Dobson, Gerrard and Pratt, *Foundations of Chemical Biology*, Oxford Chemistry Primer

## RULES, REGULATIONS, AND WHAT TO DO WHEN THINGS GO WRONG

**If in doubt:** ASK! The course co-ordinator is happy to field questions at any time. All staff involved in the course are generally available for advice on specific issues.

### What do I do if I'm sick?

If you feel that illness, injury, bereavement or other critical circumstances have prevented you from completing an item of assessment worth 10% or more of total course assessment or have affected your performance in a test or exam, you should complete an aegrotat application form, available from Student Records, 3rd floor, Registry or the Student Health and Counselling Service. You should also notify the course co-ordinator. For further details on aegrotat applications, please refer to the University's Enrolment Handbook 2010, p. 37, Aegrotat Consideration, or the University of Canterbury Calendar 2009, pp 80-81, Aegrotat Consideration). **The aegrotat 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 assessment.** If the examiner cannot assess your aegrotat application because of lack of other evidence, you may be asked to sit a special assessment if you miss a final exam. You should also expect to be required to submit additional work if you miss a major assignment (e.g. a field trip for which a major write-up is required). **Please note: acceptance of the grounds for an aegrotat application does not simply excuse you from completing items of assessment if you are requested to do so. You will be given reasonable time to complete any such work.**

### **What do I do if I have to miss something?**

In rare cases you may not be able to sit a test or exam, or attend a field trip, because of involvement in international or national representative sport or cultural groups. In such cases see the course co-ordinator, and a course of action (usually the sitting of an equivalent test or exam at a different time, or submitting an equivalent piece of written assessment) will be arranged. This should be done well in advance of the set date for a missed exam/test/assignment. **Please note – holiday trips, weddings, birthday parties etc. are not given special status in the University policy, so please do not ask for special consideration in these circumstances.**

### **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 passages from another work or author and presenting it as if it is your own work. Plagiarism includes:

- buying any form of assessed work e.g. essays, lab reports
- re-use of previous assignments
- 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.

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 are in any doubt about appropriate use of published material, please speak with a member of academic staff. If you are still unsure what plagiarism is, then seek advice.

It is a School policy that courses may request you submit work electronically for subsequent analysis of originality using *Turnitin*. Students agree that by taking courses in BIOL, required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. 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 posted on the Turnitin.com site.

### **Where do I hand in assignments and then collect them once marked?**

All assignments should be placed in the designated collection box in the foyer of the 4th floor of the School of Biological Sciences (near the Secretaries' Office), unless directed otherwise by the course co-ordinator. 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 (under Undergraduate). In addition, you may also be asked to submit your work electronically (via Learn) for analysis in *Turnitin*. You will be given instructions on how to do this in the assignment handout.

Marked assignments can be collected from the Secretaries' Office between the hours 9.30-10.30am and 1.30-2.30pm, unless directed otherwise by the course co-ordinator. 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. **If you require an extension, you should request one from the course co-ordinator** (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 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 must be handed in by the due date to gain full credit
- work handed in up to 7 days after the deadline will be marked, but the marks will be discounted 25% before they are recorded to the student's credit
- any work handed in more than 7 days after the deadline date 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. It also makes things easier to assess. 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 have a chat to the lecturer concerned about how to trim your assignment to an acceptable length.

### **What if I fail part of the course?**

In BIOL, 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 achieve an overall score of at least 40% in both in-course assessment and tests/exams (as defined in the course outline), AND a total score of at least 50%, to be awarded a passing grade (C or better).** If you fail to achieve the 40% minimum requirement, a grade of D will be awarded, even if your total score is greater than 50%.

### **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 ERAU 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 co-ordinator in the first instance. Other avenues include your class rep., who can raise issues anonymously, or the UCSA education coordinator.

### **SBS Grading**

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

A restricted pass (C-) 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 a C- grade is awarded you gain credit for the course but cannot continue into papers that require this course as a pre-requisite. NB. The C- grade is only available in first and second year papers - it cannot be awarded for third year papers.

Failing grades:

D	40-48	E	0-39
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