

Professor: Justin Powlowski

Office: SP 275.35

Phone: 848-2424 ext. 3339

Office hours: By appointment (email me to set up!)

E-mail: justin.powlowski@concordia.ca

COURSE DESCRIPTION: Prerequisite: CHEM 221, 222, 271. A survey of selected pathways in intermediary metabolism, including their regulation and physiological significance, lipid, amino acid and nucleoside metabolism, cholesterol biosynthesis, urea cycle and the biochemistry of protein synthesis. Lectures and laboratory.

READING: *Biochemistry, 8th edition*, by J.M. Berg, J.L. Tymoczko, G.J. Gatto, Jr., and L. Stryer. Additional reading may be assigned from time to time. Study problems will be assigned from Fertuck et al.'s *Student Companion to Accompany Biochemistry*.

WEB RESOURCES: There is a Moodle web site set up for this course. Information that will be found at the web site includes: course outline; problems and reading assignments; lecture notes; links to other sites; grades; lab information; and a discussion group. You will be responsible for the material at the Moodle site.

TEXTBOOK READING

We will cover the following chapters of the textbook:

Chapters: 15 and 27, mostly review

Chapters: 12, 19, 20, 22, 23, 24, 25, 26, 30, 36

GRADING:

| | |
|------------------|---------------------------------------|
| Laboratory: | 20% |
| Sapling quizzes: | 5%* |
| Class tests (3): | 75% (best=25%, middle=30%, worst=20%) |

* If the grade for the online quizzes lowers the final grade compared to counting class tests for 80%, it will be disregarded and the class tests will count for 5% more. There is no final exam.

LABS

Dr. Neema Chirwa (Neema.Chirwa@concordia.ca) is in charge of the labs.

PLEASE NOTE THAT YOU MUST PASS THE LABS TO PASS THE COURSE!
(passing lab grade = 12/20)

LAB REPORTS MUST BE YOUR OWN WORK!

There is a 10% penalty *per day* for late lab reports. **Only** the professor may give extensions, and then only for a good reason (e.g. sickness).

Attendance at labs is mandatory. Absence from a lab will result in a mark of 0. The professor may accept a valid reason for one absence. You may then be allowed to do a

make-up lab, or retrieve data from your lab partner. If you are absent without a valid reason from a lab that extends over more than one week, you are expected to get data from your lab partner and complete the lab report. You will lose marks according to the amount of time you were absent, e.g. an absence of one week out of a two week lab will result in a loss of 50% of the mark. No excuses will be accepted for a second absence. If you are absent for more than two labs, whether with a valid reason or not, you will receive a grade of R, meaning you have to repeat the course.

Being late for a lab is not acceptable. If you are more than 15 minutes late, you will not be admitted into the laboratory and your absence will be recorded as such.

Lab exemptions: Students who are repeating the course, and have passed the lab component within the past two (2) years, may request a lab exemption. Applications for the exemption (forms available in SP201.01) must be completed by May 4; late applications will not be accepted. Signed and completed forms are to be returned to Ms. Hilary Scuffell, (SP 275.01). Students **MUST** register for the appropriate lab exemption lab section; students registered in any other lab sections will be required to complete the lab portion of the course (**NO EXCEPTIONS**).

ONLINE TUTORIALS/QUIZZES via SAPLING LEARNING

An option (with an extra cost) for those of you who would like extra practice, reinforcement and active feedback on the course and background material is provided via Sapling Learning. If you choose to use this option, you will have access to a range of practice questions, and after you have completed those, a time-limited quiz that will be graded. The quizzes (one per week) can account for 5% of your final grade (see above).

If you would like to see some sample questions and acquire more information about what Sapling is all about, please go to:

<http://www.macmillanlearning.com/catalog/page/Sapling/biochemistry>

If you decide you would like to use the Sapling resources:

- Go to www.saplinglearning.ca/login to log in or create an account.
- Under Enroll in a new course, you should see Courses at [Your College]. Click to expand this list and see courses arranged by subject. Click on a subject to see the terms that courses are available.
- Click on the term to expand the menu further (note that Semester 1 refers to the first course in a sequence and not necessarily the first term of the school year).
- Once the menus are fully expanded, you'll see a link to a specific course. If this is indeed the course you'd like to register for, click the link.
- Enter the key code: [KEY CODE]
- Review the [system requirements](#) and confirm that Flash is updated and enabled in your browser.

The following link includes more detailed instructions on how to register for your course:
<https://community.macmillan.com/docs/DOC-5972-sapling-learning-registering-for-courses>

Need Help? The Sapling technical support team can be reached by phone or by webform via the Student Support Community. Here are their hours and contact information:

<https://community.macmillan.com/docs/DOC-6915-students-still-need-help>.

CLASS TESTS

The dates of the class tests are indicated in the class schedule (below). If you are sick that day, you may **ask for permission** to write the make-up test. One make-up test will be given, 1 week later than the scheduled test. No excuses will be accepted for missing the make-up test. Test dates will not be changed for any reason. For class test 3, an approved medical note stating that you were unable to write an exam will be the only request for deferral that is accepted.

OBJECTIVES

We will survey the metabolism of carbohydrates (other than glucose), lipids, amino acids and nucleotides. The chemistry involved will be emphasized throughout, and the underlying logic discussed. Mechanisms of metabolic regulation, and the integration of the various pathways will be covered in an attempt to unify the diverse reaction sequences encountered throughout the course. The emphasis will be on understanding the metabolic principles, rather than on being able to memorize metabolic pathways. A section on protein biosynthesis will complete the course.

LECTURE SCHEDULE

| | |
|------------|--|
| May 3 | Course introduction; review of metabolic concepts |
| May 8 | Experimental approaches; biochemical reaction types |
| May 10 | Photosynthesis, light reactions |
| May 15 | Calvin cycle and C ₄ pathway |
| May 17 | Pentose phosphate pathway |
| May 22 | Lipids and fatty acids |
| May 24 | Fatty acid oxidation |
| May 29 | Class Test 1 |
| May 31 | Fatty acid biosynthesis |
| June 5 | Triacylglycerols and phospholipids |
| June 7 | Eicosanoids and sphingolipids |
| June 12 | Cholesterol biosynthesis |
| June 14 | Steroid biosynthesis and action |
| June 19-26 | <i>Midterm Break (no class or labs)</i> |
| June 28 | Lipoproteins and lipid transport |
| July 3 | Overview of amino acid metabolism; ammonia-utilizing enzymes |
| July 5 | Urea cycle, protein turnover and amino acid catabolism |
| July 10 | Class Test 2 |
| July 12 | Nitrogen fixation; amino acid biosynthesis |
| July 17 | Amino acid biosynthesis; 1-carbon metabolism |
| July 19 | Pyrimidine metabolism |
| July 24 | Purine metabolism |
| July 26 | Deoxyribonucleotide synthesis; ribonucleotide reductase |
| July 31 | Protein biosynthesis |
| Aug. 2 | Protein biosynthesis |
| Aug. 7 | Class Test 3 |
| Aug. 9 | Drug development |

(Note that I tend to fall behind at the beginning and catch up in the second half!)

PLAGIARISM AND OTHER FORMS OF ACADEMIC DISHONESTY

The academic code of conduct can be found in section 17.10 of the academic calendar (<http://www.concordia.ca/academics/undergraduate/calendar/current/17-10.html>). Any form of unauthorized collaboration, cheating, copying or plagiarism found in this course will be reported and the appropriate sanctions applied. The Department of Chemistry and Biochemistry offers a seminar on the academic conduct code and the appropriate use of information sources which aims to clarify what practices will be considered unacceptable with regards to work submitted for grading in Chemistry and Biochemistry courses. Attendance at this seminar is highly recommended and represents a clear and fair opportunity to learn what our faculty regards as academic misconduct. Failure to take part in this learning opportunity and thus ignorance of these regulations is no excuse and will not result in a reduced sanction in any case where academic misconduct is observed. This short seminar (1 hour) will be held at the following times (note that late-comers will not be admitted):

| Date | Time | Place |
|----------------|-------------|--------------|
| Friday, May 11 | 17:45-18:45 | SP S110 |

A sign-up sheet is available inside SP 201.01 (Departmental office). Please be on time-latecomers will not be admitted!