

**COURSE OUTLINE**

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Office hours: Tuesday 10:30 – 11:30 and Thursday 15:00 – 16:00 or by appointment

**INTRODUCTION**

Biochemistry is the study of chemical molecules and chemical reactions in living organisms. Examples of important molecules are carbohydrates, lipids, proteins, and nucleic acids. In this course we will cover the structures and properties of carbohydrates and proteins as well as some introductory metabolism. A living cell has to be able to provide the building blocks for all the important structures of the cell and the energy needed to carry out metabolic processes. A cell must take up nutrients and get rid of waste. Cells need to be able to interact with other cells in a multicellular organism. In this course we will begin to look at some of these cellular processes, mainly how the cell uses glucose to provide energy, and how energy can be stored in the form of carbohydrates. It is important to remember that biochemistry is an experimental science, so we will also cover the theory behind some common techniques. The lab part of the course will provide you with an opportunity to use some of these techniques yourselves.

**TEXTBOOKS**

Required: J.M. Berg, J.L. Tymoczko, G.J. Gatto, Jr., and L. Stryer, *Biochemistry*, 9<sup>th</sup> ed., W.H. Freeman and Company. (8<sup>th</sup> ed. also acceptable).

Required: CHEM 271: Laboratory and tutorial manual. (You should use this year's edition as the content from previous years may not be the same!)

**SCHEDULE**

<b>Lecture date</b>	<b>Topic</b>	<b>Berg <i>et al.</i> <i>Biochemistry</i> 9<sup>th</sup> ed.</b>
Sept. 3	Introduction, amino acids	1, 2
Sept. 5	Amino acids, peptides and pH	1, 2
Sept. 10	Proteins (primary, secondary structure)	2
Sept. 12	Proteins (higher order structure)	2
Sept. 17	Evolution and bioinformatics	6
Sept. 19	Hemoglobin	7
Sept. 24	Exploring proteins	3
Sept. 26	Enzymes: basic concepts	8
Oct. 1	Enzymes: kinetics	8
Oct. 3	CLASS TEST 1	
Oct. 8	Enzymes: inhibitors	8
Oct. 10	Enzymes: mechanisms	9
Oct. 15	Enzymes: regulation	10
Oct. 17	Introduction to metabolism	15

Oct. 22	Carbohydrates	11
Oct. 24	Glycolysis	16
Oct. 29	Glycolysis	16
Oct. 31	Glycolysis and Gluconeogenesis	16
Nov. 5	CLASS TEST 2 (lectures 9-16)	
Nov. 7	Glycogen metabolism	21
Nov. 12	Citric acid cycle	17
Nov. 14	Citric acid cycle	17
Nov. 19	Bioenergetics	13, 18
Nov. 21	Oxidative phosphorylation	18
Nov. 26	Oxidative phosphorylation	18
Nov. 28	Integration of metabolism	27

### Genbank assignment due at lecture October 24

#### GRADING

Tutorials and labs	25%
Class tests	35% (15+20 or 20+15)
SaplingPlus *	5%
Final *	35%

\* If counting the final exam for 40% and SaplingPlus for 0% ends up being higher, then the mark for SaplingPlus will be disregarded

**SaplingPlus:** SaplingPlus can either be purchased as part of the textbook, or separately. You can enroll with SaplingPlus at the following website: [www.saplinglearning.com/login](http://www.saplinglearning.com/login). Quizzes and homework will be assigned on a regular basis and will account for 5% of your grade.

If you miss a class test and have a valid excuse, you may ask for my permission to write a make-up test. This will be given only once, one week after the scheduled class test and during class time. If you miss the make-up test you will receive a grade of 0 for that test. If you cannot write the final exam, you must make arrangements with the examination office to write a deferred exam.

Please note that space in the labs and tutorials is limited, so you **MUST follow the schedule of the group you have been assigned to**. No changing sections. To accommodate all of the students each lab/tutorial section has been divided into two groups (A or B). The two groups will alternate between labs one week and tutorial the other week. You will be informed through email as to which group you have been placed in. If you have a **valid** reason to switch groups, please contact Mr. Mihai Ciortea (SP238 / phone: 514-848-2424 x3363/ [mihai.ciortea@concordia.ca](mailto:mihai.ciortea@concordia.ca)).

For each lab you will have to hand in a short lab report. The marks for the tutorials will be based on quizzes and assignments. There are 11 elements and one (lowest mark or medical exemption) will be dropped. The remaining 10 will be scaled to a mark out of 25. If you are absent from the lab or the tutorial you may not hand in the reports or assignments or do the quizzes. You will be assigned a grade of 0 for that particular part. In order to pass the course, **YOU MUST PASS THE LAB COURSE** with at least a grade of 60%. If you do not receive a grade of 15/25, your final grade will be R which means you have to repeat the course.

**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 SP 201.01) must be completed by noon September 6<sup>th</sup>, the end of the first week of term (*i.e.* prior to the start of the laboratory); late applications will not be accepted. Signed and completed forms are to be returned to Ms. Lisa Montesano, (SP 270.01). Students **MUST** register for the appropriate lab exemption lab/tutorial section; students registered in any other lab/tutorial sections will be required to complete the lab portion of the course (**NO EXCEPTIONS**).

### **STRATEGIC LEARNING**

There are additional weekly review sessions organized outside of the regularly scheduled classes. To obtain more information on the Strategic Learning (SL) program please see: <http://www.concordia.ca/students/success/learning-support/strategic-learning-sessions.html>. Your SL leader will provide more information in class.

### **ACADEMIC CONDUCT**

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>) (<http://www.concordia.ca/students/academic-integrity.html>). Any form of academic misconduct found in this course will be reported and the appropriate sanctions applied. The Department of Chemistry and Biochemistry offers a seminar on the academic code of conduct 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):

<b>Date</b>	<b>Time</b>	<b>Room</b>
Monday, Sept. 16	16:45-17:45	CC 111
Tuesday, Sept. 17	16:45-17:45	CC 308
Tuesday, Sept. 17	20:45-21:45	HB 130
Wednesday, Sept. 18	16:45-17:45	CC 308
Wednesday, Sept. 18	20:45-21:45	HB 130
Thursday, Sept. 19	16:45-17:45	HC 155
Friday, Sept. 20	16:45-17:45	HC 157

As space for each of the seminars is limited by the room size, please sign up to your preferred time. Sign up sheets are available outside SP 201.01 (Departmental office).

**The University offers many services that can help students:**

Concordia Counseling and Development offers career services, psychological services, student learning services, *etc.* –

<http://www.concordia.ca/students/counselling.html>

The Concordia Library Citation and Style Guides –

<http://library.concordia.ca/help/howto/citations.html>

Advocacy and Support Services – <http://www.concordia.ca/offices/advocacy.html/>

New Student Program –

<http://www.concordia.ca/students/success/new.html>

Students with Disabilities – <http://www.concordia.ca/offices/acsd.html/>

Student Success Centre –

<http://www.concordia.ca/students/success.html>

Financial Aid & Awards – <http://www.concordia.ca/offices/faao.html>

Health Services – <http://www.concordia.ca/students/health.html>