

FACULTY OF SCIENCE
Department of Biology
Course Outline

SC/BIOL 2020 3.00
Biochemistry
Fall 2014

GENERAL INFORMATION

Course

Description: A study of the cell biology and biochemistry of biomolecules. Topics include intermediary metabolism related to bioenergetics, including the biology of mitochondria, protein structure and function, nucleic acid replication, gene expression, chromosome organization and recombinant DNA technology. Three lecture hours.

Prerequisites: Prerequisites: Both SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00 or SC/BIOL 1010 6.00; both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, or SC/CHEM 1000 6.00. Course credit exclusions: SC/BIOL 2020 4.00, SC/BCHM 2020 4.00, SC/CHEM 2050 4.00.

Course Director: Dr. Terrance Kubiseski

Schedule: Lectures: Tuesday and Thursday, 8:30 AM - 10:00 AM, LAS A

Evaluation: Two midterm tests: 20% of overall mark each
Final Exam: 60% of overall mark

The final exam is cumulative but weighted. Each section will end up having equal representation over the 3 exams.

Exam Format: Mostly (or all) multiple choice questions (will be announced in class).

Important Dates: First Midterm: October 7, 2014
Second Midterm: November 11, 2014
Final Exam: TBD

Drop date: November 7, 2014

Note: for additional important dates such as holidays, refer to the “Important Dates” section of the Registrar’s Website at <http://www.yorku.ca/yorkweb/cs.htm>

INSTRUCTOR CONTACT INFORMATION

Life Sciences Building, Rm 329C
416-736-2100 x 40519
biol2020@yorku.ca

Email: Questions requiring short answers can be asked via email up to 24 hours before a midterm or final. Please send email questions to: biol2020@yorku.ca, and allow for at least 24 hours for a reply. ***PLEASE*** include a brief and descriptive subject line in your email. If you want a response, all course related questions must be sent to this account. Questions requiring lengthy answers should be asked before or after class, or during office hours.

Office Hours: Office Hours are between 11:30am - 12:30am Thursday, Rm 213 LSB.

RESOURCES

Texts: Required text:

McKee and McKee: *Biochemistry: The Molecular Basis of Life*. (2010) 5th ed., Oxford publishing, with study guide.

Optional supplementary text:

Tymoczko, Berg and Stryer: *Biochemistry: A Short Course*. (2010) 1st ed., Freeman Publishing.

Alberts *et al.* (2008) *Molecular Biology of the Cell*, 5th ed., Garland Publishing.

Boyer (2006) *Concepts in Biochemistry*, 3rd ed. Wiley Publishing.

Website: <https://moodle.yorku.ca>; will include PDF file of slides presented before lectures and audio stream after lectures.

Please note that access to the slides and audio stream are offered, but **are not guaranteed** to the students of this course. If access is denied or prevented due to a technical issue, it is **NOT** the responsibility of the course director to alter conditions of the course or exam (such as change its date) or provide alternate methods to supply course material to students. It is the responsibility of the student to attend and obtain all course material in person during lectures.

LEARNING OUTCOMES

Upon successful completion of this course, students should be able to:

- Understand in depth the various concepts taught in class.
- Understand various biochemical processes that occur in normal and diseased states.
- Explain and interpret data from the various biochemical situations taught during lectures.
- Apply their acquired knowledge and understanding to synthesize logical conclusions from experiments and experimental results.

COURSE OUTLINE

The following topics will be covered in lecture although there may be alterations at the discretion of the course director. Lecture material will be posted online. The Buffers section of the course is not covered well in textbooks so I've posted readings on the course website.

Section	Topic	Reading (McKee and McKee)
Section 1: Buffers, amino acids and protein structure	Introduction, chemical bonds	Chapters 1, 3
	Water, acids, bases, buffers	Chapter 3
	Amino Acids	Chapter 5
	Protein Structure (secondary)	
	Protein Structure (tertiary) and	

	Hemoglobin structure/function	
	Enzyme Kinetics and Inhibition	Chapter 6
Section 2:	Carbohydrates	Chapter 7
DNA & RNA structure and molecular biology techniques	DNA & RNA structure	Chapter 17
	DNA replication and repair	Chapter 18
	DNA transcription	
	Regulation of gene expression	
	Protein Synthesis	Chapter 19
Section 3:	Metabolism and energy transfer	Chapter 4, 8
Metabolism	Glucose metabolism: glycolysis and gluconeogenesis	Chapter 8
	Oxidation of pyruvate, citric acid cycle	Chapter 9, 10
	Oxidative phosphorylation and electron transport	
	Metabolism of fatty acids and amino acids	Chapter 11, 12, 14
	Coordination of metabolism	Chapter 16

This second year course will focus on a wide range of topics within Biochemistry. In order to fully understand the material presented during lecture, a basic understanding of chemical principles and cellular molecular biology (i.e. BIOL 1010, CHEM 1000 & 1001) will be expected of candidate students. Although most of the curriculum can be found in the course recommended text, certain topics, such as the practical application of several biochemical techniques, will NOT be found in the text. Thus, in order to be as successful as possible, each student should attempt to be present for all lectures. Students are also encouraged to consult additional references sources (e.g. biochemistry books on reserve in the library).

Chapters correspond to McKee and McKee, *Biochemistry: The Molecular Basis of Life*. Coverage of chapters will not be complete, and where indicated the lectures will cover

only selected topics from the chapter. Students are advised to attend all lectures and study those sections of the text relevant to the lecture topics. Exam questions will relate to the lecture topics and any related information presented in the lectures that may not be covered in the textbook. Students are encouraged to search for other reference material that complements the lectures.

EXPERIENTIAL EDUCATION AND E-LEARNING

This course uses a course website (Moodle) and audio streaming (Moodle). Some teaching videos/programs related to course topics will be provided.

OTHER INFORMATION

EXPECTATIONS: Attendance is **expected** and all in-class information (even material not written on lecture slides) is testable material in the midterms and final exams.

COURSE POLICIES

1. If you miss an exam (midterm or final) with a legitimate documented reason, documentation must be submitted to me (Dr. Kubiseski) in order to avoid receiving a grade of zero on the exam. Only a "York Attending Physician's Statement Form" (can be downloaded as part of the Petitions Package) OR a similarly detailed doctor's note (i.e. not simply a form stating that the student visited a clinic) will be accepted for medical excuses.
2. In the event of one missed midterm with a valid documented reason, the weight of this midterm will be transferred to the final exam. **No makeup exam will be available for midterms.** In the event of a missed final exam with a valid, documented reason (where both midterms have been written), one deferred final exam will be offered during the Biology deferred exam period in the winter or spring of 2015. If the deferred exam is missed, the student will be required to petition the course. In the event that a student misses more than one exam with valid documented reasons (two midterms, a midterm and a final, or all three exams), the student will be required to petition in order to take the deferred final exam.
3. In order to be fair and consistent to the entire class, individual grades are not negotiable. Contact me about marks **ONLY** if there is a clear error in your mark (calculation, clerical, etc.) as soon as possible at biol2020@yorku.ca.
4. Students are allowed to record lectures using their own recording devices. However, taking pictures of slides and exam questions will **NOT** be allowed. **Absolutely** no cell

phones are allowed in the exam hall during midterms or the final exam.

UNIVERSITY POLICIES

1. Students who miss the final exam and would like an opportunity to write it must request and obtain deferred standing. A Deferred Standing Agreement form must be completed and submitted with appropriate supporting documentation (such as an Attending Physician's Statement for illness) to the professor or Biology Undergraduate Office. Senate Policy requires that "Normal requests for deferred standing must be communicated within one week following a missed examination, or on the last day to submit course work". The policy and forms for obtaining deferred standing may be found at <http://www.registrar.yorku.ca/exams/deferred/index.htm>

2. All students are expected to familiarize themselves with the following information, available on the Senate Committee on Academic Standards, Curriculum & Pedagogy webpage (see Reports, Initiatives, Documents)

<http://www.yorku.ca/univsec/senate/committees/ascp/documents/CourseInformationForStudentsAugust2012.pdf>

- Senate Policy on Academic Honesty and the Academic Integrity Website
- Course accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation