

## Department of Biology Course Outline

SC/BIOL2020A 3.00, Biochemistry  
Summer, 2020

### Course Description

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

### 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 Instructors and Contact Information

Course Director: Dr. Banafsheh Mehrazma, Dr. Dominic Narang,  
Emails: Questions about **course administration** issues should be sent to [bmehrazm@yorku.ca](mailto:bmehrazm@yorku.ca) or [dnarang@yorku.ca](mailto:dnarang@yorku.ca)  
Emails about **course material** are to be sent to [bio2020A@yorku.ca](mailto:bio2020A@yorku.ca)

### Schedule

**Lectures:** Prerecorded lectures will be available through Moodle ahead of the class. In case of technicality issues, the course can be done online, through Zoom, and the link will be sent ahead of time.  
The online classes will be held from 8:30-11:30 am, on Tuesdays and Thursdays and will be recorded. If pre-recorded lectures are provided, then Q&A sessions will take place on the scheduled day according to the course content table in this file, either on Tuesdays or Thursdays, from 9:30 – 11:30 am through Zoom. The meeting ID to the Zoom meeting will be posted on Moodle.

### Evaluation

#### Grading:

Midterm 1: 25% or 0% (optional)  
Midterm 2: 25% or 0% (optional)  
Final Exam: 50%, 75% or 100%

Midterms are optional. Missed midterms (for any reason) will have their weight transferred to the final exam, up to a 100% final exam. There are no makeup midterms. See Course Policies for other information. Section 1 will be tested on Midterm 1 and Section 2 will be tested on Midterm 2. The final exam is cumulative.

## Important Dates

**DROP DEADLINE FOR THIS COURSE IS June 8<sup>th</sup>, 2020**

**Midterm 1: May 26<sup>th</sup>, 2020**

**Midterm 2: June 9<sup>th</sup>, 2020**

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>

## Resources

**Text:** "Lehninger Principles of Biochemistry" by Nelson and Cox, 7<sup>th</sup> edition, OPTIONAL  
Lecture slides along with prerecorded lectures available via course website accessible via Moodle @ York

**Accessibility to a computer & Internet:** All students require having access to a computer and the internet, as the course is done remotely. You will need access to Moodle for updates and having Zoom installed on your computer for Q&A sessions.

## Learning Outcomes

Upon successful completion of this course, students should understand the major classes of biomolecules and the mechanisms by which cells express genetic information and utilize and store energy. The students should also to apply concepts covered in the course to problem sets related to current biochemical methods and research.

## Other Information

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 1000 & 1001, 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.

Chapters correspond to Lehninger, 7<sup>th</sup> edition. 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.

This course emphasizes the ability to apply knowledge gained in BIOL2020. As a consequence, testing will focus on situations and the ability of the student to analyze data and anticipate outcomes. Again, the critical thinking required by the student would be strengthened by attending all lectures. In order to EARN an "A" in this course, students must demonstrate the ability to apply their knowledge.

## Course Content

Section	DATE	TOPIC	READING (Lehninger)
Section 1: Buffers, amino acids and protein structure	<b>May 12<sup>th</sup></b> By BM	Introduction, chemical bonds	Chapter 1
		Water, acids & bases, buffers	Chapter 2
	<b>May 14<sup>st</sup></b> By DN	Amino acids	Chapter 3
		Protein structure (secondary)	Chapter 4
	<b>May 19<sup>th</sup></b> By BM	Protein structure (tertiary), protein purification	Chapter 3, 4
		Hemoglobin, enzymes kinetics	Chapter 5, 6
	<b>May 21<sup>th</sup></b> By DN	Enzyme kinetics & inhibition	Chapter 6
Carbohydrates		Chapter 7	
Section 2: DNA & RNA structure and techniques	<b>May 26<sup>th</sup></b> By BM	Nucleotides and Nucleic Acids	Chapter 8
		Midterm 1	
	<b>May 28<sup>th</sup></b> By DN	DNA replication and repair	Chapter 25
		RNA transcription and Processing	Chapter 26
	<b>June 2<sup>nd</sup></b> By BM	Translation & Protein Targeting and degradation	Chapter 27
		Regulation of gene expression	Chapter 28
	<b>June 4<sup>th</sup></b> By DN	Recombinant DNA technology	Chapter 8, 9
Metabolism and energy transfer		Chapter 13, 15	
Section 3: Metabolism	<b>June 9<sup>th</sup></b> By DN	Glycolysis & gluconeogenesis	Chapter 14
		Midterm 2	
	<b>June 11<sup>rd</sup></b> By BM	Oxidation of pyruvate, citric acid cycle	Chapter 16
		Oxidative phosphorylation and electron transport	Chapter 19
	<b>June 16<sup>th</sup></b> By BM	Metabolism of fatty acids	Chapter 17, 21
		Metabolism of amino acids	Chapter 18, 22
	<b>June 18<sup>th</sup></b> By DN	Coordination of metabolism	Chapter 23

**Exams are held remotely.** Midterm 1 will test section 1 (red) and Midterm 2 will test section 2 (green).

**The final exam is cumulative.**

## Course Policies

1. If you miss a midterm exam for any reason the weight of the midterm will be transferred to the final exam. Midterms are optional; grades will be calculated based on the highest possible score incorporating or dropping the midterm scores. Under this scheme, only midterms whose scores are higher than the final exam score are counted toward the final grade. Thus, the final exam is worth either 50%, 75%, or 100% of your final grade, **but the minimum that the final exam will count for your grade is 50%**. The final exam must be worth at least 50%, and the midterms are counted as being worth 25% or 0%. The final exam is cumulative.

Some examples of how grades would be calculated based on following situations:

**Student A:** Midterm 1 score: 80%; Midterm 2 score: 50%; Final exam score: 75%.

*Student A did better on Midterm 1 than on the final exam, but worse on Midterm 2 than the final exam. Their grade is calculated as 25% Midterm 1, 0% Midterm 2, 75% Final exam. **The midterms count as 25% or 0%. Midterm 1 will not be counted as worth more than 25% just because the student did better on it than Midterm 2. If you do badly on a midterm that weight is only transferred to the final exam.***

**Student B:** Midterm 1 score: 0% (didn't write); Midterm 2: 65%, Final exam: 70%.

*Student B did better on the final exam than both Midterms 1 & 2. Their grade is calculated as a 100% final exam.*

**Student C:** Midterm 1: 80%; Midterm 2: 80%, Final exam: 60%.

*Student C did better on both Midterms 1 & 2 than the final. Their grade is calculated as Midterm 1: 25%, Midterm 2: 25%, Final exam: 50%. **The final exam must count for at least 50%, and the midterms cannot count for more than 25%.***

**Student D:** Midterm 1: 0% (didn't write), Midterm 2: 0% (didn't write), Final exam: 45%.

*Student D wrote neither midterm and thought they would be fine with a 100% final exam. Their final grade is 45%.*

2. All exams will be multiple-choice, and/or containing short answer questions.

3. In order to be fair and consistent with regards 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 [bmehrazm@yorku.ca](mailto:bmehrazm@yorku.ca) or [dnarang@yorku.ca](mailto:dnarang@yorku.ca). It is highly unlikely that you will receive a response regarding any other mark-related queries.

4. Students who do not write the final exam with a legitimate documented reason (unplanned medical or family emergency) must acquire documentation that must be submitted to me (Dr. Mehrazma or Dr. Narang) 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. Students must contact me for permission to write a deferred exam (i.e. fill and sign the Deferred Standing Agreement form). It is Senate Policy that "Normal requests for deferred standing must be communicated **within one week following a missed examination**". Please check out the Registrar's Office Deferred Standing FAQs (<http://www.registrar.yorku.ca/exams/deferred>) for more details.

5. This course requires the use of online proctoring for examinations. The instructor may use an online proctoring service to deliver the exam(s), which would be administered through the Learning Management System (e.g. Moodle, Canvas, etc.). Students are required to have access to minimum technology requirements to complete examinations. If an online proctoring service is used, students will need to become familiar with it at least five days before exam(s). For technology requirements, Frequently Asked Questions (FAQs) and details about the online proctoring service visit – [[link to be added](#)]. Students are required to share any IT accommodation needs with the instructor as soon as they are able."

6. Students shall note the following:

- Zoom is hosted on servers in the U.S. This includes recordings done through Zoom.

- If you have privacy concerns about your data, provide only your first name or a nickname when you join a session.
- The system is configured in a way that all participants are automatically notified when a session is being recorded. In other words, a session cannot be recorded without you knowing about it.

## University Policies

### Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - [http://www.yorku.ca/spark/academic\\_integrity/index.html](http://www.yorku.ca/spark/academic_integrity/index.html)

### Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

### **Additional information is available at the following websites:**

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon –

<http://www.glendon.yorku.ca/counselling/personal-counselling/what-is-counselling/>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

### Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

### Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at [http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf)

### Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>