

Department of Biology Course Outline

SC/BIOL 2020 (Section A) 3.00 Biochemistry Fall 2021

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. Not open to Chemistry majors. Three lecture hours. One term. Three credits.

Prerequisites

(1) Both SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00, or SC/ISCI 1110 6.00, or both SC/ISCI 1101 3.00 and SC/ISCI 1102 3.00; and (2) both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00, or SC/CHEM 1000 6.00, or both SC/ISCI 1201 3.00 and SC/ISCI 1202 3.00, or SC/ISCI 1210 6.00.
Course credit exclusion: SC/CHEM 2050 4.00.

Course Instructors and Contact Information

Instructor: Dr. Kyle Belozarov

Contact: Chemistry Building (CB216)
vbelozar@yorku.ca (**communication by e-mail is HIGHLY preferred**)
Phone: 416-736-2100 x77188

Office hours: TBA (will take place via Zoom)

Schedule

Lectures: Tuesdays and Thursdays 8:30 am – 10:00 am (delivered fully online)
All lectures will be recorded and the recordings will be available on Moodle.

Evaluation

Midterm 1 (October 19, during lecture)..... 20%
Midterm 2 (November 23, during lecture)..... 20%
Weekly online quizzes (10 total).....10%
Peer-assessed writing project.....10%
“Compose an MC question” assignment 5%
Final exam (cumulative, 3 hours, date TBA)..... 35%

Midterm information: Midterms will be conducted during lectures (8:30 – 10:00 am) through eClass or Crowdmark. Midterms will consist of both multiple-choice and short-answer questions. If you miss the midterm (for any reason, including Internet connectivity problems), its weight will be automatically moved to the final exam. No need to submit any documentation. There will be no make-up midterms.

Weekly online quizzes: The quizzes will be offered through eClass starting on the week of September 20. Each quiz will open on Monday and close on Sunday at 11:59 pm. You will be given two attempts for each quiz, with the highest score of the two counting as the quiz mark. Only best eight completed quizzes will count towards your grade, and you can miss any two quizzes for any reason, including illness. You will earn a zero for every missed quiz beyond the allowed two, no exceptions.

Peer-assessed writing project: For this assignment, you will choose any topic that we have covered in the course (or will cover in the coming lectures) and prepare a 1-page written summary of it following the specific instructions that will be posted on eClass. Your submission will be reviewed by three anonymous peers from the class, and you will review three submissions by other students. The grade for the project will be determined by the reviews you receive and by the completion of your own reviews. Submissions will be due on November 28, and the reviews will be due on December 5. The project will be administered using eClass.

“Compose an MC question” assignment: As you study for the midterms/exam, you will compose your own multiple-choice (MC) questions that you believe could be used on these evaluations. For each assignment, you will compose four MC questions (with 4-5 answer options each) and submit them to eClass. The deadlines for each submission will be October 16, November 12, and December 7. No deadline extensions will be provided, regardless of the circumstances. By the end of the semester, you will have submitted a total of 12 MC questions. They will be reviewed by the TA. Only valid MC questions will be accepted (please do not submit random text).

Final exam information: The exam will be cumulative and will cover all the course material evenly. The date and time of the exam will be announced by the Registrar’s Office in mid-November. It is the student’s responsibility to check the Registrar’s Office website for final exam schedule. The format of the exam will be similar to midterms. More information about the exam will be provided towards the end of the semester.

Important Dates

Classes start:	September 8
Fall Reading Week	October 9 - 15
Drop Deadline:	November 12 (Last day to drop the course without receiving a grade)
Course withdrawal:	November 13 - December 7 (Course still appears on transcript, but no grade will be shown; W notation)
End of classes:	December 7
Final Exam:	TBA, during the December exam period (Dec 9 – 23)

For additional important dates such as holidays, refer to the [“Important Dates”](#) section of the Registrar’s Website.

Resources



Textbook: Lehninger Principles of Biochemistry, 8th edition (ISBN-13: 978-1-319-22800-2). The textbook is available from the York University Bookstore as soft-cover, loose-leaf and e-text versions. Reserve copies will be available at the Steacie Science library. Earlier editions of the text could be used for readings, but page numbers and problem numbers will correspond to the 8th edition. There will be weekly suggested readings and assigned end-of-chapter problems from the textbook.

eClass: All lecture slides, lecture recordings, online homework, and other materials will be posted regularly to the eClass website.

Learning Outcomes

By the end of the course, you should be able to:

- Identify major classes of biological molecules and their polymers by their chemical structure
- Describe the chemical properties of proteins, nucleic acids, carbohydrates, and fatty acids, and the details of their metabolism
- Describe the mechanisms by which biological molecules and systems are regulated and coordinated in normal and diseased states
- Describe the relationship between energy and biological processes, and know how organisms utilize and store energy
- Describe the mechanisms by which cells store and express genetic information
- Explain and interpret data from the various biochemical contexts taught in class
- Apply the acquired knowledge and understanding to synthesize logical conclusions from experiments and experimental results.

Course Content

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 and CHEM 1000 & 1001) will be expected of enrolled 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 study both the material presented in lectures and in the assigned textbook readings.

Lecture Topics will Include:

- Introduction to chemical bonds
- Water and Buffers
- Amino Acids and Protein Structure
- Enzyme Kinetics and Inhibition
- Carbohydrates
- DNA and RNA structure
- DNA replication and Repair
- Transcription and Translation
- Regulation of Gene Transcription
- Metabolism and Energy Transfer
- Glycolysis and Gluconeogenesis
- NADH production
- Oxidative Phosphorylation
- Coordination of Metabolism

A detailed Lecture Outline will be provided on eClass.

Experiential Education and E-Learning

E-Learning components:

- eClass Website, synchronous lectures and office hours via Zoom
- Weekly online homework
- Writing and peer-review activity

Course Policies

1. **Missed evaluation policy:** If you miss the midterm (for any reason), its weight will also be automatically moved to the final exam. No need to submit any documentation. There will be no make-up midterms.
2. If you request that I re-mark an evaluation, please keep in mind that re-marking can result in your score being raised, confirmed, or lowered. Second round of re-marking will not be offered.
3. Standard accommodation policies as set by the university will be followed in the course.
4. All students in the course must be familiar with York University's policies on academic integrity. Please consult the following website for more detail:
<http://www.yorku.ca/academicintegrity/students/index.htm>
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 [<https://registrar.yorku.ca/proctortrack-faq>]. Technology requirements are described within. Students are required to share any IT accommodation needs with the instructor as soon as they are able.

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/academicintegrity/>

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.

Student's 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.html>

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 (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/>