

## Department of Biology Course Outline

### SC/BIOL 2020 (Section A) 3.00 Biochemistry Fall 2024

#### 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 Belozerov

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

**Office hours:** TBA (will take in person and will not be recorded)

#### Schedule

**Lectures:** Tuesdays and Thursdays 10:00 am – 11:30 am (fully in-person) at LAS A  
All lectures will be recorded (barring technical problems beyond the instructor's control) and the recordings will be available on eClass.

#### Evaluation

**Midterm 1 (October 8, during lecture)..... 20%**  
**Midterm 2 (November 19, during lecture)..... 20%**  
**Online quizzes (5 total).....15%**  
**Peer-assessed writing project.....10%**  
**Final exam (cumulative, 3 hours, date TBA)..... 35%**

**Midterm information:** Midterms will take place during lectures (10:00 – 11:20 am) and may consist of multiple-choice and/or short-answer questions. Midterms will be closed-book and based on individual work. Students should bring writing utensils, any calculator, and a student ID to the midterms. No unauthorized devices, e.g. cell phones, will be allowed during the midterms. A formula sheet will be provided, if needed. If you miss the midterm (for any reason, including illness), its weight will be

automatically moved to the final exam. No need to submit any documentation. There will be no make-up midterms.

**Online quizzes:** The quizzes will be offered through eClass starting on the week of September 23. 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 four completed quizzes will count towards your grade, and therefore you can miss any one quiz for any reason, including illness. You will earn a zero for every missed quiz beyond the allowed one quiz, 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 24, and the reviews will be due on December 1. The project will be administered using eClass.

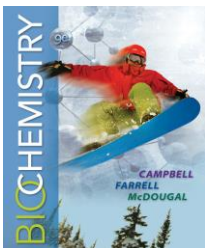
**Final exam information:** The exam will be cumulative and will cover all the course material evenly. The date and time of the exam will be announced by the Registrar's Office in mid-November. It is the student's responsibility to check the Registrar's Office website for final exam schedule. The format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

## Important Dates

<b>Classes start:</b>	September 4
<b>Fall Reading Week</b>	October 12 - 18
<b>Drop Deadline:</b>	November 8 (Last day to drop the course without receiving a grade)
<b>Course withdrawal:</b>	November 9 - December 3 (Course still appears on transcript, but no grade will be shown; W notation)
<b>End of classes:</b>	December 3
<b>Final Exam:</b>	TBA, during the December exam period (Dec 5 – 20)

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

## Resources



**Textbook:** Biochemistry by Mary K. Campbell/Shawn O. Farrell/Shawn O. Farrell/Owen M. McDougal, 9<sup>th</sup> edition (ISBN-13: 978-1-305-96113-5). The textbook is available from the York University Bookstore as hard-cover and D1D e-text versions. Reserve copies should be available at the Steacie Science library. Earlier editions of the text are also acceptable.

**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, may be presented only in lectures. Thus, in order to be as successful as possible, each student should study both the material presented in lectures and in the respective chapters of the textbook.

### **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
- 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>

## 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 the 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 relating 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 encouraged to register with Student Accessibility Services (SAS) as early as possible to ensure that appropriate accommodation can be provided with advance notice. Students may wish to discuss the nature of their accommodations with their professor early in the term.

Many students registered with SAS are entitled to midterm and final exam accommodations such as extra time. These students must register and book their tests and exams with the Alt Exam Centre at York as soon as possible.

The department of biology, or your professor, will not be able to provide extra time during the midterms/final exam. **The extra time during these evaluations can only be received by the arrangement with the Alt Exam center made by the student.**

Additional information is available at <https://accessibility.students.yorku.ca>

Students with accommodation letters issued by SAS do not need to email them to the course director. All Letters of Accommodation (LOA) issued by SAS are automatically delivered to the course director.

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](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/>