

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.

Instructor

Dr. Emanuel Rosonina | rosonina@yorku.ca | 416-736-2100 x44702

Prof. Rosonina will be available to meet with students after class and during office hours (usually through Zoom). Check eClass for office hours dates/times and to sign up in advance.

Course Website and Technology Requirements

eclass.yorku.ca | The website includes complete and updated course information. It is accessible to enrolled students only. Check the website frequently for updates.

Midterm exams and online quizzes will be held online through eClass. Students are required to have access to high-speed internet for these assessments. Office hours will generally be held online through Zoom, but students preferring to meet in-person may request so in advance.

Prerequisites

Prerequisites from both groups below are required and are strictly enforced. Course credit exclusion: SC/CHEM 2050 4.00.

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
2. Both SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00
Or SC/ISCI 1210 6.00
Or both SC/ISCI 1201 3.00 and SC/ISCI 1202 3.00

Course Dates

Lectures: In-person on Tuesdays and Thursdays | 10:00a – 11:30a | ACW 206

Midterm 1: Tuesday, February 6 | 10:00a

Midterm 2: Tuesday, March 12 | 10:00a

Final exam: To be scheduled within Winter exam period, April 10 - 26

Online quizzes: See below

Assignment submission period: March 28 – April 5

Drop deadline: March 11 | Last day to drop course without receiving grade

Course withdrawal period: March 12 – April 8 | Withdraw and receive a “W” notation

Textbooks

All course material will be presented in class, on eClass, or through other resources provided by the instructor. There is no required textbook, but some students might find either of the following optional textbooks helpful.

Lehninger Principles of Biochemistry, by Nelson and Cox. 8th Edition.

Biochemistry, by Campbell, Farrell, and McDougal. 9th Edition.

Learning Outcomes

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

- Identify major biological molecules and their polymers by their chemical structure,
- Describe the chemical properties of proteins, nucleic acids, carbohydrates, and fatty acids, and details of their biosynthesis and/or metabolism,
- Describe methods by which biological molecules and systems are regulated and coordinated,
- Describe the relationship between energy and biological processes.

Evaluation

Component	Covers	Value	
Midterm 1	Lect. 1 - 8	25%] At the end of the course, the value of these components will be automatically transferred to the final exam if that improves your grade. If you do not complete any of these components, for any reason, their value will be transferred to the final exam. See eClass for details.
Midterm 2	Lect. 9 – 15*	25%	
Online quizzes	See below	10%	
Assignment	See below	5%	
Final Exam	All lectures	35%	

*For Midterm 2, students will have to recall some material from Part 1 of the course (Lectures 1 – 8).

Midterms

Midterm exams will be held online using eClass during normal class hours. They will consist of multiple-choice and short-answer questions. More information about exam timing will be provided during class. At the end of the course, the value of the midterm exams (25% or 50%) will be automatically transferred to the final exam if that improves your grade.

Missed midterm exams: If you miss one or both midterm exams for any reason, the value (25% or 50%) will be automatically transferred to the final exam. You do not have to inform the instructor or provide documentation. No make-up exams will be held.

Online Quizzes

Six online quizzes will be held through eClass, as indicated below. Each quiz will contain six questions (mostly multiple choice), for a total of 36 questions. However, the total grade will be marked out of 30, with a maximum grade of 100%. Quizzes will be open for 24 hours, but you will have a limited time to complete them once started. At the end of the course, the total value of the online quizzes (10%) will be automatically transferred to the final exam if that improves your grade.

Missed online quizzes. If you are unable to complete all six quizzes for any reason, the total value of the quizzes (10%) will be automatically transferred to the final exam.

Quiz	Material Covered	Date*
Online Quiz 1	Lectures 1 – 4	Friday, January 19
Online Quiz 2	Lectures 5 – 8	Friday, February 2
Online Quiz 3	Lectures 9 – 11	Friday, February 16
Online Quiz 4	Lectures 12 – 15	Friday, March 8
Online Quiz 5	Lectures 16 – 18	Friday, March 22
Online Quiz 6	Lectures 19 – 21	Thursday , April 4

*Each quiz will open at 12:01a and close at 11:59p on the date indicated above.

Online Exam and Quiz Policies

Each student will be randomly assigned unique exams/quizzes that are of equal difficulty to the exams/quizzes of their peers. Note the following policies:

- Online exam and quiz questions will be sequential. Each question must be answered before moving to the next question. You will not be able to go back to previous questions.
- Students are not permitted to access unauthorized aids during exams and quizzes, including:
 - Communicating with any other person by any means;
 - Performing web searches or using artificial intelligence (AI) resources (e.g., ChatGPT);
 - Accessing non-permitted materials including course materials, textbooks, lecture slides, and notes;
 - Using devices (including phones, tablets, smartwatches, computers, etc.) or computer programs/applications except for accessing the exam.
- Students are not permitted to record or capture any part of an exam through any means. This includes photographing, screen capturing, copying questions in any way, or committing any part of the exam to memory with the intention of sharing with others.

Assignment

Create five multiple choice questions based on course material, including two questions based on Part 1 (Lectures 1 – 8), two questions from Part 2 (Lectures 9 – 15), and one question from Part 3 (Lectures 16 – 21). Questions are to be unique, formatted properly according to the instructions, and at an appropriate level for a second-year university biochemistry course. Submission is through eClass, opens on March 28 (9:00a), and closes at 5:00p sharp on April 5. At the end of this period, the submission link will close and assignments will no longer be accepted. Your grade will be zero if you do not submit within this period. See eClass for detailed instructions.

Final Exam

The final exam will be held in-person during the Winter term exam period. The exam is cumulative, but more questions will focus on Part 3 (Lectures 16 – 22) than on Parts 1 and 2. The exam will consist mostly of multiple-choice questions but can include other formats.

Value: The final exam is worth at least 35%. However, at the end of the course, the value of the midterms and/or the online quizzes will be automatically transferred to the final exam if that improves your grade. See eClass for details.

Missed final exam: If you miss the final exam for any reason, your grade will be zero. Your final grade will then be based on the two midterms (25% each), the online quizzes (10%), and the assignment (5%). By course policy, requests for deferred status (through the Deferred Standing Agreement form) will be declined. However, you may petition to your home faculty for deferred status, and see the special note below about waivers to this policy. See eClass for further and updated details.

Special note about waivers to the no-deferral policy for the final exam: By course policy, requests for deferred status for the final exam are declined by the instructor, and students must file a petition if they wish their home faculty to reconsider this decision. However, under certain extenuating circumstances (e.g., illness or misfortune), the instructor may, at his discretion, waive this policy and hold a deferred final exam without the need for a petition. Regular class attendance (as determined by participation in Clicker Questions) and completion of midterm exams and online quizzes are factors that the instructor will consider when deciding whether to waive the no-deferral policy. In other words, if you regularly attend class and complete midterm exams and quizzes, but miss the final exam due to illness or misfortune, the instructor may choose to offer you a deferred final exam without the need for a petition.

Course Content and Timetable

The following is a preliminary schedule of topics to be covered in the course. Updates can be expected.

PART	DATE	LECTURE	TOPICS
Part 1: Buffers, Amino Acids, Proteins (Lectures 1 – 8)	Jan. 9	1	Introduction, Biomolecules, Chemical Bonds
	Jan. 11	2	Water, Acids, Bases, Buffers
	Jan. 16	3	Amino Acids
	Jan. 18	4	Protein Structure
	Jan. 23	5	Protein Folding, Hemoglobin
	Jan. 25	6	Protein Isolation and Purification
	Jan. 30	7	Enzymes, Enzyme Kinetics
	Feb. 1	8	Enzyme Inhibition and Regulation
	Feb. 6	Midterm Exam 1 (Lectures 1 – 8)	
Part 2: Carbohydrates, DNA & RNA, Translation (Lectures 9 – 15)	Feb. 8	9	Carbohydrates
	Feb. 13	10	Carbohydrates, Nucleic Acids
	Feb. 15	11	Nucleases, DNA Replication
	Feb. 27	12	DNA Damage and Repair, Transcription
	Feb. 29	13	Pre-mRNA Processing, Gene Regulation
	Mar. 5	14	Protein Synthesis (Translation)
	Mar. 7	15	Protein Regulation, Molecular Biology Techniques
	Mar. 12	Midterm Exam 2 (Lectures 9 – 15)	
Part 3: Metabolism (Lectures 16 – 22)	Mar. 14	16	Metabolism and Energy Transfer
	Mar. 19	17	Glycolysis and Gluconeogenesis
	Mar. 21	18	Pyruvate Oxidation, Citric Acid Cycle
	Mar. 26	19	Electron Transport, Oxidative Phosphor.
	Mar. 28	20	Fatty Acid and Lipid Metabolism
	Apr. 2	21	Nitrogen Metabolism, Coordination of Metabolism
	Apr. 4	22	To be announced

Additional Policies

The instructor is committed to fostering, to the best of his abilities, an environment for learning that is inclusive for everyone regardless of gender identity, gender expression, sex, sexual orientation, race, ethnicity, ability, religion, or age. Every person associated with this class, including students, instructors, teaching assistants, and guests, should be treated with respect during all interactions.

Copyright notice: Course materials (including lecture slides and recordings, quizzes, exams, etc.) are owned by the course instructor or other copyright holders. Sharing or posting course material is not permitted without the written permission of the instructor.

Exam formats: Regular exams may be of any format but will consist primarily of multiple-choice and short-answer questions. If you are permitted to write an exam outside of the regularly scheduled times, for whatever reason, that exam may be of a different format (including oral-exam format) but of equal difficulty.

For current **university policies**, refer to the York University Undergraduate Academic Calendar. The website is: <https://calendars.students.yorku.ca/>

Final course grades may be adjusted to conform to program or faculty grades distribution profiles.