BIOL/BCHM 3130 3.00 | Molecular Biology II: Regulation of Gene Expression | Summer 2024

Course Description

Gene structure and function. Mechanisms of gene expression in prokaryotes and eukaryotes. Storage and retrieval of genetic information; transcription, translation and their control. Three lecture hours, twice per week. One term. Three credits.

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. Check eClass for office hours dates/times and to sign up.

Course Website

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

Prerequisites

SC/BIOL 3110 3.00 or SC/BCHM 3110 3.00

Course Dates

Lectures: In-person on Tuesdays and Thursdays from 10:00a – 1:00p in room LSB 103

Midterm 1: Tuesday, July 16 | 10:00a (LSB 103)

Midterm 2: Tuesday, July 30 | 10:00a (LSB 103)

Assignment: Thursday, August 8 (To be completed online during class time)

Final exam: To be scheduled within the S2 exam period, August 16 - 23

Drop deadline: July 29 | Last day to drop course without receiving grade

Course withdrawal period: July 30 – August 13 | Withdraw and receive a "W" notation

Textbooks

There is no required textbook for the course. Some students may find general molecular biology textbooks helpful, including the suggested text listed below which is available at Steacie Library.

Molecular Biology, Fifth Edition, (2012) by Robert F. Weaver. McGraw Hill.

Learning Outcomes

Upon successful completion of this course, students will:

- Be able to describe multiple levels of regulation of gene expression in prokaryotes and eukaryotes,
- Understand a variety of molecular biology techniques so that they can:
- Critically evaluate molecular biology data
- Design experiments for addressing questions related to gene expression regulation

Evaluation

Component	Covers	Value	
Midterm 1	Lect. 1 – 4	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. 5 – 8*	25%	
Assignment	See below	15%	
Final Exam	All lectures	35%	

*For Midterm 2, students will have to recall some material presented in Lectures 1 – 4.

Midterms

Midterm exams will be held in-person during normal class hours. They will consist of questions of a variety of formats. 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.

Assignment

A published research article will be assigned about nine days before the assignment date. The assignment consists of a number of questions about the article to be answered sequentially online using eClass during class hours (10:00 AM to 1:00 PM) from any location. The due date is a scheduled class period, so all students are expected to be available. Your grade will be zero if you do not submit within this period, and the value of the assignment (15%) will be transferred to the final exam. See eClass for detailed instructions.

Final Exam

The final exam is mandatory and will be held in-person during the S2 term exam period. The exam is cumulative, but more questions will focus on Part III (Lectures 9 and 10) than on Parts I and II. The exam will consist of a variety of question 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 assignment 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) and the assignment (15%). 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. See eClass for details. If you have exceptional circumstances or an urgency for completing the course, please inform the instructor.

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 I: Introduction, Techniques, and Prokaryotic Transcription (Lectures 1 – 4)	July 2	1	Introduction, Techniques for Studying Gene Expression I
	July 4	2	Techniques for Studying Gene Expression II
	July 9	3	Transcription in Bacteria, Operons
	July 11	4	Shifts in Bacterial Gene Expression, DNA-Protein Interactions in Bacteria
	July 16	**Midterm Exam 1 (Lectures 1 – 4)**	
Part II: Eukaryotic Transcription and Gene Expression (Lectures 5 – 8)		5	RNA Polymerases
	July 18	6	Promoters, General Transcription Factors, Mediator, Promoter Clearance
	July 23	7	Transcriptional Activators, Pre-mRNA Splicing
	July 25	8	Capping and 3′-End Formation, Coordination of Gene Expression
	July 30	**Midterm Exam 2 (Lectures 5 – 8)**	
Part III: Translation and Modulating Gene Expression (Lectures 9 & 10)	Aug. 1	9	Translation, Genetic Code, mRNA Quality Control
	Aug. 6	10	Pre-rRNA and Pre-tRNA Processing, RNA Interference, Modulating Gene Expression in the Lab, Current Topics in Gene Regulation
	Aug. 8	**Assignment (Complete online during class time)**	

Additional Policies

Cheating: Strict rules apply during exams and other assessments to prevent cheating. These will be outlined before exams, but include the following: Cell phones must not be seen any time in the exam room, otherwise the student with the phone will be expelled from the room and not permitted to complete the exam. If you need your phone to present ID, you will be permitted to do so only when requested.

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

Exam formats: 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) 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.