

Department of Biology Course Outline

SC/BIOL3130N 3.00, Molecular Biology II: Regulation of Gene Expression Winter, 2017

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. One term. Three credits.

Prerequisites

SC/BIOL 3110 3.00 or SC/BCHM 3110 3.00.

Course Instructors and Contact Information

Course Director: Dr. Mark Bayfield, LSB327E
Email: bayfield@yorku.ca

Schedule

Lectures: Tuesdays and Thursdays, 11:30-1:00, Tuesdays and Thursdays, LSB 103

Office Hours: Thursdays 8:00 – 9:00 am, LSB 1st floor common study area and various online Q&A sessions at times to be determined.

Evaluation

Grading:

Midterm 1: 25%
Midterm 2: 25%
Final Exam: 50%

Section 1 will be tested on Midterm 1 and Section 2 will be tested on Midterm 2. The final exam is cumulative but weighted; it will have a higher proportion of material from section 3 than sections 1 or 2.

Important Dates

DROP DEADLINE FOR THIS COURSE IS March 10th, 2017

Midterm 1: February 7th, 2017, during lecture time

Midterm 2: March 14th, 2017, during lecture time

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at <https://registrar.yorku.ca/enrol/dates/fw16>

Resources

Text: "Molecular Biology" by Robert Weaver (2011), Fifth edition, WCB/McGraw Hill, on reserve in Steacie Library and for sale at bookstore

Lecture slides available via course website accessible via Moodle @ York

Learning Outcomes

1. Understand the mechanisms by which several important cellular factors function in the control of gene expression and regulation. Particular focus will be placed on the mechanisms of transcription and translation and how these differ between prokaryotes and eukaryotes. The course will also cover several levels of gene regulation that have only been discovered more recently.
2. Understand the nature of the experimental methods that were used to generate the data that provided us with our current understanding of the mechanisms of gene regulation. You should be able to describe the rationale for these methods and apply your understanding of these to predict outcomes of hypothetical experiments.

Course Content

Section	Date	Topic	Reading (Weaver)
Introduction, Techniques	January 5 th	Intro, Review of Previous Material	Chapters 3&4
	January 10 th	Molecular Tools for Studying Genes	Chapter 5
Prokaryotic Transcription	January 12 th	Transcription in Prokaryotes I	Chapter 6
	January 17 th	Transcription in Prokaryotes II	
	January 19 th	Operons	Chapter 7
	January 24 th	DNA-Protein Binding in Bacteria	Chapter 9
	January 26 th	Eukaryotic Polymerases & Promoters	Chapter 10
	January 31 st	General Eukaryotic Transcription Factors	Chapter 11
	February 2 nd	Eukaryotic Transcriptional Activators	
Eukaryotic Transcription	February 7 th	Midterm 1	Chapter 12
	February 9 th	Chromatin Structure and Epigenetics	Chapter 13
	February 14 th	Splicing and Alternative Splicing	Chapter 14
	February 16 th	rRNA and tRNA Processing; Catalytic RNA	Chapter 14, 16
	February 28 th	mRNA Capping and Poly-adenylation	Chapter 15
	March 2 nd	Co-ordination of mRNA Processing	
	March 7 th	RNA turnover and NMD	Chapter 17
Translation	March 9 th	Initiation: Prokaryotes vs. Eukaryotes	
	March 14 th	Midterm 2	Chapter 17
	March 16 th	Translational Control	Chapter 18
	March 21 st	Elongation and Termination	Chapter 19
Post-transcriptional control of gene expression	March 23 rd	Ribosome and tRNA structure	Chapter 16
	March 28 th	RNAi	
	March 30 th	Student Choice Lecture	Not in textbook
	April 4 th	Review	

The red and green shaded lectures will be tested on midterms 1 & 2, respectively. The final exam is cumulative and weighted. This means that all material will be allocated approximately equal weighting on the exams by the end of the course. This means that the final exam will test proportionally more material on the final section (blue), **but will still have material covering the red and green sections.**

Course Policies

1. If you miss an exam (midterm or final) with a legitimate documented reason, documentation must be submitted to me (Dr. Bayfield) 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. I must receive all documentation supporting your excuse for missing an exam within 2 weeks of the missed exam.
2. In the event of a missed midterm with a valid documented reason, an oral makeup midterm exam will be offered. Oral makeup exams will occur in my office (LSB327E) in which the student will be asked questions and answers will be given orally for a total time of approximately 20 to 30 minutes. Answers will be recorded and a teaching assistant will also be in attendance. In the event of a missed final exam with a valid, documented reason, where the student wrote both scheduled midterms (no makeup was given), a deferred final exam will be offered. In the event that a student misses one or both written midterms and then misses the final exam the student will be required to petition in order to take the deferred final exam.
3. The midterms and final exam will include written questions. If you believe that an answer on a test was marked incorrectly, you must submit your (written) rationale and paper for remarking within 1 week of the test being made available to you. In order to be considered for remarking, exams must be written in ink. Note: Remarking can result in the mark being raised, confirmed or lowered.
4. In order to be fair and consistent with regards to the entire class, individual grades are not negotiable and all students will be graded only as per the marking scheme. Contact me about marks ONLY if there is a clear error in your mark (calculation, clerical, etc.) as soon as possible at bayfield@yorku.ca. It is highly unlikely that you will receive a response regarding any other mark-related queries.
5. Students who do not write the final exam, but have completed both written midterms must contact me for permission to write a deferred exam (i.e. 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, or on the last day to submit course work". Please check out the Registrar's Office Deferred Standing FAQs (<http://www.registrar.yorku.ca/exams/deferred/index.htm>) for more details. Students who have missed more than one written midterm will be required to petition to write a deferred final exam.
6. Students **must** have taken all prerequisites in order to stay in the course. You should not enroll in the course if you do not have the prerequisites. Students that have enrolled without the required prerequisites will be required to leave the course.

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

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

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/>