



MBG*3040 Molecular Biology of the Gene

Fall 2018
Section(s): C01

Department of Molecular and Cellular Biology
Credit Weight: 0.50
Version 2.00 - August 27, 2018

1 Course Details

1.1 Calendar Description

In this course, the structure, expression, control and modification of eukaryotic genes will be discussed with an emphasis on the underlying mechanisms and structure/function relationships. Many topics covered in introductory courses are included but discussed at a more advanced level. Students will have the opportunity to learn current genetic concepts and principles through lectures, as well as the application of this knowledge in the real world through primary literature reading and group research projects.

Pre-Requisite(s): MCB*2050
Restriction(s): MBG*4080

1.2 Course Description

This is an advanced genetics course focused on eukaryotic gene expression and regulation. The structure, expression, control and modification of genes will be discussed with an emphasis on the underlying mechanisms and structure/function relationships. Many topics covered in introductory courses are included but discussed at a much more advanced level. Students will have the opportunity to learn current genetic concepts and principles through lectures, as well as application of this knowledge in the real world through primary literature reading and group research projects.

1.3 Timetable

Timetable is subject to change. Please see WebAdvisor for the latest information.

Lectures: Tuesdays and Thursdays, 11:30-12:50, RICH 2529

Instructor's Office Hours: Wednesdays, 9:30-12:00; 1:30-4:00, SSC 3443

(Students may drop in at any time, although you may be asked to wait for a few minutes or come back later if I am busy)

Key Dates

- **Tue Sept 25:** In-class tutorial;
- **Thu Oct 4:** 1st quiz;
- **Fri Nov 2:** 40th class day -- Last day to drop the course;
- **Thu Nov 8:** 2nd quiz;
- **Thu Nov 15:** Due date for the essay;
- **Fri Dec 7:** Final Exam;

1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

Dec. 7, 11:30-1:30, Location (TBA)

2 Instructional Support

2.1 Instructor(s)

Ray Lu

Email:

rlu@uoguelph.ca

Telephone:

+1-519-824-4120 x56247

Office:

SSC 3443

Office Hours:

Wednesdays 9:30am-noon; 1:30-4:00;

Or by appointment;

Or Students may drop in at any time, although you may be asked to wait for a few minutes or come back later if I am busy

2.2 Teaching Assistant(s)

Teaching Assistant:

Michael McLaughlin

Office Hours:

Please do not contact your TA outside the classroom, unless you are given permission to do so.

3 Learning Resources

3.1 Required Resource(s)

Molecular Biology (Textbook)

Molecular Biology. R.F. Weaver, McGraw-Hill Higher Education, 5th (2012) edition.

On reserve in the Library.

Courselink (Website)

<https://courselink.uoguelph.ca>

This course will make use of the University of Guelph's course website Courselink. Consequently, you are responsible for all information posted on the Courselink page for MBG*3040. Please check it regularly.

3.2 Recommended Resource(s)

Lewin's Genes (Textbook)

Lewin's Genes XI (2014), Krebs, Goldstein and Kilpatrick, Jones & Bartlett Learning.

On reserve at the Library.

Molecular Biology of the Gene (Textbook)

Molecular Biology of the Gene, J.D. Watson, T.A. Baker, S.P. Bell, A. Gann, M. Levine, R. Losick, 7th (2014) Edition, CSH Press.

On reserve in the Library.

Undergraduate Calendar (Website)

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/>

The Undergraduate Calendar is the source of information about the University of Guelph's procedures, policies and regulations, which apply to undergraduate programs.

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Describe molecular structure and properties of genes and chromatin
 2. Recognize and describe complex eukaryotic gene regulation at the transcriptional, post-transcriptional, translational and post-translational levels
 3. Classify and explain macromolecular interactions involved in specific gene regulatory mechanisms
 4. Identify molecular biology techniques appropriate for particular gene regulation problems, and analyze and interpret experimental results
 5. Use online tools to research a particular topic, and critically review primary research articles in molecular genetics in working groups and individually
 6. Communicate science (in both written and oral forms) effectively
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5 Teaching and Learning Activities

5.1 Lecture

Week 1

Topic(s):	1. Analysis of a Primary Research Article
Week 2	
Topic(s):	2. Eukaryotic Transcription and Its Regulation 2.1. RNA polymerases and promoters 2.2. General transcription factors
Week 3	
Topic(s):	2.3. Transcription activators and repressors
Week 4-5	
Topic(s):	2.4. Chromatin structure and epigenetics
Week 6	
Topic(s):	2.5. RNA splicing and processing
Week 7	
Topic(s):	3. Post-Transcriptional Events and Regulation 3.1. mRNA stability and localization
Week 8	
Topic(s):	3.2. RNA interference
Week 9	
Topic(s):	4. Translation and Its Regulation 4.1. Initiation of Translation in Eukaryotes
Week 10	
Topic(s):	4.2. Mechanisms of Eukaryotic Initiation Control
Tue, Nov 13	
Topic(s):	Group Presentations 1 and 2
Thu, Nov 15	
Topic(s):	Group Presentations 3 and 4
Tue, Nov 20	
Topic(s):	Group Presentations 5 and 6
Thu, Nov 22	

four weeks ahead of the presentation date.

Written essays (20 pages double-spaced) will use the same topics. The group essay should be completed using Google Docs and shared with Dr. Lu at uofgmbg@gmail.com. The essay is due at **noon, Thursday Nov 15**, to a designated group Dropbox folder on CourseLink. Each group needs only send one copy of your essay.

The corresponding presentation and essay groups are required to write a critique of the other group's work. The presentation critique is due at **noon, one week after the presentation** and the essay critique is due at **noon, Thursday Nov 22**, to a designated Dropbox on CourseLink. **Each student needs to submit his/her own critique.**

Assessment

Form of Assessment	Weight of Assessment (% of final)	Course Content /Activity	Learning Outcome (see above)	
Quiz 1	15%	Lectures 1-7	1-4	
Quiz 2	15%	Lectures 8-14;	1-4	
	Oral presentation	30%	Non-lecture	1-6
Option 1	2-page critique of peer group essay	5%	Non-lecture	5-6
Option 2	Written essay	30%	Non-lecture	1-6
	2-page critique of the peer group presentation	5%	Non-lecture	5-6

Participation of Discussion* 5%	Non-lecture	5-6
Final Exam 30%	Week 1-12 lecture and non- lecture materials	1-4

- **A maximum of three stickers will be given to students who participate in classroom discussions: one sticker per answer; maximum one sticker per student per class. Oral presenters will automatically get one sticker.**
- **One sticker is worth 1% of the final grades; two stickers 3% and three stickers 5%;**
- **When you have collected three stickers, you will have one additional alternative/optional question to choose on your final exam.**

The two quizzes (1 hour long) and the final exams will be short-answer questions that often require synthesis of ideas and facts from various parts of the course. The two quizzes are not accumulative, i.e. Quiz #2 will not cover the material that is Quiz #1. The Final Exam will be comprehensive and covers the entire course material, including the main points in students' presentations.

7 Course Statements

7.1 Missing Quizzes

If you miss one quiz and academic consideration is granted, your other quiz will be re-weighted to 30%

If you miss both quizzes and academic consideration is granted, your final exam will be re-weighted to 60%.

7.2 Grading

Essays are due by Noon on the due date, via submission to designated folders on the CourseLink web sites. Late essays submitted on the same due date will result in 5% penalty, and 5% penalty for each additional day.

Students who wish to have their midterm exams re-graded must submit their exams to the instructor within 5 class days of the return of the midterm exam. The entire midterm exam will be re-graded so the mark may go up, down or remain unchanged.

8 Department of Molecular and Cellular Biology

Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The regulations and

procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: www.uoguelph.ca/sas

9.6 Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The [Academic Misconduct Policy](#) is detailed in the Undergraduate Calendar.

9.7 Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless

further permission is granted.

9.8 Resources

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.
