



# MCB\*2050 Molecular Biology of the Cell

Winter 2018

Sections(s): C01

College of Biological Science

Credit Weight: 0.50

Version 1.00 - January 02, 2018

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## 1 Course Details

### 1.1 Calendar Description

This course will develop an understanding of the key concepts of the molecular biology of the cell, integrating principles of cell structure and function with the underlying molecular mechanism(s). Discussions will focus on aspects of gene regulation, genomics, cell cycle control, protein synthesis, intracellular protein trafficking and protein degradation in eukaryotic cells. Many of these concepts will be discussed in the context of how defects in cellular processes give rise to disease.

**Pre-Requisite(s):** BIOC\*2580, MBG\*2040

### 1.2 Course Description

Course Objectives:

This course builds on the fundamental concepts of genes, genetics and molecular biology that are covered in MBG\*2040, and continues to develop a deeper understanding of the molecular biology of the cell by integrating principles of cell structure and function with the underlying molecular mechanisms. Discussions will focus on aspects of gene regulation, genomics, cell cycle control, protein synthesis, intracellular protein trafficking and protein degradation in eukaryotic cells and techniques used to study them. Many of these concepts will be discussed in the context of diseases that are caused by defects in these cellular processes. (0.5 credits, Prerequisites: BIOC\*2580, MBG\*2040)

### 1.3 Timetable

Section 1: Mondays, Wednesdays, and Fridays at 10:30 am – 11:20 am in ROZH 104

Section 2: Mondays, Wednesdays, and Fridays at 12:30 pm - 1:20 pm in ALEX 200

Lectures representing the basic course material are further clarified and amplified by text material and tutorial assignments. Students are responsible for all material given in lectures and tutorials.

### 1.4 Final Exam

## 2 Instructional Support

### 2.1 Instructor(s)

**Jenna Penney**

**Email:** penneyj@uoguelph.ca  
**Office:** SSC 3516  
**Office Hours:** Mon/Wed 1:30-2:30 pm

### 2.2 Instructional Support Team

**Course Co-ordinator:** Elspeth Smith  
**Email:** elspeths@uoguelph.ca  
**Telephone:** +1-519-824-4120 x56583  
**Office:** SC1 3505  
**Office Hours:** Mondays: 2:30 pm -3:30 pm or by appointment

### 2.3 Teaching Assistants

The tutorial instructors are graduate students, many of them in the Department of Molecular and Cellular Biology. Please do not contact them outside of your tutorial hours unless they have given you permission to do so.

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## 3 Learning Resources

### 3.1 Required Resources(s)

#### **Principles of Genetics (Textbook)**

Principles of Genetics by P. Snustad and M.J. Simmons, 7th Edition, 2016. John Wiley and Sons, Inc. New York, NY.

Available on a 2 hour reserve in the library.

#### **Cell and Molecular Biology: Concepts and Experiments (Textbook)**

Cell and Molecular Biology: Concepts and Experiments by Gerald Karp, 8th Edition, 2016. John Wiley and Sons, Inc. New York, NY.

Available on a 2 hour reserve in the library.

#### **Courselink (Website)**

<https://courselink.uoguelph.ca>

There is a CourseLink web site set up for this course. You can access this CourseLink from <http://courselink.uoguelph.ca>. Your username is your Central Login ID and your password is your uoguelph email password.

The online forums are meant for discussions concerning course material only. Non-course related postings are not permitted. We always appreciate your comments to improve our

teaching; however, suggestions or complaints about the course should be brought up to the instructors directly, but not to be posted onto the forum. All postings deemed inappropriate will be removed.

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## 4 Learning Outcomes

### 4.1 Course Learning Outcomes

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

1. Describe a gene and explain the key molecular mechanisms of eukaryotic gene regulation and expression at various levels from DNA to chromosomes and final products.
  2. Apply genetic and molecular principles to analyzing and interpreting experimental data.
  3. Explain the conceptual and technical aspects of various molecular techniques and bioinformatics and be able to apply them to analysis of genes, genomes and gene products.
  4. Describe, with examples, the molecular basis of select genetic diseases, how to map them to the genome and how to apply molecular techniques for their diagnoses and perhaps treatment.
  5. Describe the basis of biotechnology as applied to microbes, animals and plants.
  6. Explain the genetic/molecular principles underlying cell cycle control and cancer.
  7. Explain the relationship between structure and function of the endomembrane system and nucleus.
  8. Explain the synthesis, quality control and intracellular trafficking of biological molecules to specific subcellular compartments.
  9. Synthesize ideas and communicate concepts in cellular and molecular biology using written communication skills in written assignments and examinations.
  10. Manage time effectively and follow instructions to meet deadlines for course requirements.
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## 5 Teaching and Learning Activities

### 5.1 Lecture

Topic(s):		Tentative Lecture Schedule
Lectures	Topic	Text Chapter
1-4	Techniques of Molecular Biology	14 (Snustad)
5-7	Genomics	15 (Snustad)
8-10	Applications of Molecular Genetics	16 (Snustad)
11-14	Regulation of Gene Expression in	19 (Snustad)

Eukaryotes

15-18 Genetic Basis of Cancer and Cell Cycle Control 21 (Snustad)

**Midterm Exam**

**(covers lectures up to and including Feb. 16th 2018)**

**Saturday Mar. 3rd at 4:00 pm - 5:30 pm  
Location to be announced**

19-21	Nucleus and Nuclear Transport	12 (Karp)
22-24	Endomembrane System	8 (Karp)
25-27	Vesicular Trafficking – ER to Golgi	8 (Karp)
28-30	Lysosome and Endocytic Pathway	8 (Karp)
31-33	Mitochondria	5 (Karp)
34-36	Chloroplasts and Peroxisomes	5,6,8 (Karp)

**Final Exam**

**Tuesday Apr. 10th**

**2:30 pm - 4:30 pm**

**Location to be announced**

\*Lecture numbers are approximate and are provided as a guide to the order of material covered. Some topics may be discussed over more lecture slots and some less than indicated.

## Recording:

Electronic recording or photographs of lectures and tutorials is expressly forbidden without prior consent of the instructor. When recordings are permitted, they are solely for the use of the authorized students and may not be reproduced, or transmitted to others, without the express written consent of the instructor. You should not be using electronic devices, like cell phones and ipads during lecture. Not only is it distracting you from the lecture, but also distracting to those around you. If you have to use a laptop, it should be for only lecture related material (e.g. taking notes).

## 5.2 Seminar

**Topic(s):** Tutorial and Online Quiz Schedule

<b>Week of</b>	<b>Topic</b>	<b>Quiz Opens (4:30pm)/ Closes (11:59pm)</b>
Jan. 8th	No Tutorials	
Jan. 15th	No Tutorials	
Jan. 22nd	Restriction Mapping	Quiz 1: Jan. 24th/30th
Jan. 29th	PCR	Quiz 2: Jan. 31st/Feb.6th
Feb. 5th	Genetic Diagnosis	Quiz 3: Feb. 7th/13th
Feb. 12th	Gene Expression	Quiz 4:Feb. 14th/27th
Feb. 19th	<b>Winter Break</b>	
	<b>Midterm Exam</b>	
Feb. 26th	<b>Saturday March 3rd</b>	
	<b>4:00 pm - 5:30 pm</b>	
Mar. 5th	Nucleus and Nuclear Transport	Quiz 5: Mar. 7th/13th
Mar. 12th	ER and Golgi compartments	Quiz 6: Mar. 14th/20th
Mar. 19th	Secretory and Endocytic Pathways	Quiz 7: Mar. 21st/27th
Mar. 26th	No Tutorials	
Apr. 2nd	No Tutorials	
	<b>Final Exam</b>	
	<b>Tuesday April 10th</b>	
	<b>2:30pm - 4:30 pm</b>	

## 5.3 Tutorials

Tutorial sessions are designed to improve your understanding of the course material, provide an opportunity for group discussions and develop your problem solving skills by working through assignments. Each assignment is based on lectures and readings and consists of several problem-solving questions to be completed within the tutorial session. 2-3 of these questions will be completed with the assistance of the TA and ONE question will be completed in small student groups **without TA assistance**. Assignments are posted on the course website the week before each tutorial. You must bring the entire tutorial document to your tutorial and hand in the complete, **stapled** assignment at the end of the tutorial. Under no circumstances may someone else hand in a tutorial assignment for you. While all questions must be completed, only the question completed without TA assistance will be marked for accuracy; this mark will be your grade for that tutorial. There are seven tutorials and assignments scheduled throughout the semester; see schedule below. Your top 6 assignments will be used to calculate your Tutorial grade for 7.5% of your final grade (or up to 1.25% each). With acceptable documentation, the weight of missed tutorial assignments will be transferred to the final exam.

## 5.4 Online Quizzes

Throughout the semester there will be seven online quizzes, one to accompany each tutorial. These quizzes will test you on the content covered in both lectures and the tutorials as well as provide practice for the midterm and final exam. Each quiz will be open the Wednesday afternoon at 4:30 pm the week of the associated tutorial and close one week later, Tuesday at 11:59 pm. It is recommended that you wait until you have completed the associated tutorial before attempting to write the quiz. You will be given 30 min. to complete 10 multiple choice and short answer questions. You will have **one** opportunity to take each quiz. The answers to these questions can be found entirely in the lecture notes and textbook readings. Once the quiz closes you will be able to view which questions you answered incorrectly. Any additional questions regarding the quizzes can be directed to the course coordinator. Your top 6 quizzes will be used to calculate your Online Quiz grade which accounts for 7.5% of your final grade (or up to 1.25% for each quiz). With acceptable documentation, the weight of missed tutorial assignments will be transferred to the final exam.

## 5.5 Note

**Any dispute regarding your tutorial or online quiz marks has to be raised within one week after the marks are posted.**

**Posting any tutorial or quiz questions on any social media or course material sharing**

websites violates University of Guelph copyright and Academic Integrity policies and is considered academic misconduct. Please refer to the section on Academic Integrity below for more information regarding expectations and penalties.

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## 6 Assessments

### 6.1 Assessment Details

#### Tutorial Assignments (7.50%)

**Date:** In scheduled tutorials  
Best 6 out of 7

#### Online Quizzes (7.50%)

**Date:** Open for one week after scheduled tutorials  
Best 6 out of 7

#### Midterm Examination (35.00%)

**Date:** Sat, Mar 3, 4:00 PM

There will be a midterm examination on **Saturday March 3rd at 4:00 pm - 5:30 pm**. The midterm examination is compulsory and accounts for 35% of your final grade. Alternate times may be set for midterm exams only if there is a direct conflict with another course that has been reported to the instructor by February 2nd, or with a Gryphon Varsity event that is confirmed by the team coach. No other reasons will be accepted, including medical and compassionate reasons.

**If a student does not write the midterm they will receive a grade of 0% unless proper documentation is presented in person to the course instructors no later than 4:30 pm on Wednesday, March 7th.**

#### Final Exam (50.00%)

**Date:** Tue, Apr 10, 2:30 PM

**The final exam is scheduled on Tuesday April 10<sup>th</sup> at 2:30 pm to 4:30 pm. The final exam is a compulsory examination and will be comprehensive covering content from the entire course.**

### 6.2 Grade Assessment

Assessment	Value (% of final grade)	Date	Learning Outcomes
Tutorial Assignments	7.5% (Best 6 out of 7)	In scheduled tutorials	1-10
Online Quizzes	7.5% (Best 6 out of 7)	Week before scheduled tutorials	1-10
Midterm Exam	35%	Saturday, Mar. 3rd	1-6

## 7 Course Statements

### 7.1 Policy for Re-grading of Midterm Exams

Students who wish to have their midterm exam re-graded must submit a request to the instructor within 1 week after writing the midterm exam. The entire midterm exam will be re-graded so the mark may go up, down or remain unchanged.

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## 8 College of Biological Science 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.
- 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: [Chemistry & Physics Help](#) and [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.
  - [Student Health Services](#) is located on campus and is available to provide medical attention.
  - 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](#).
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## 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](http://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.

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