**MCB*2050**
**Molecular Biology of the Cell**
**Winter 2014**

**Department of Molecular and Cellular Biology**
**University of Guelph**

# COURSE OBJECTIVES

This course builds on the fundamental concepts of genetics and molecular biology that are covered in MBG*2040, and continues to develop an 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. Many of these concepts will be discussed in the context of normal development and differentiation, as well as diseases that are caused by defects in these cellular processes.

# COURSE PERSONNEL

**INSTRUCTORS**: Dr. Ray Lu (Lectures 1-18)
Office: SCIE 3443
Ext. 56247,
Email: rlu@uoguelph.ca

Dr. George Van der Merwe (Lectures 19-35)
Office: SCIE 2243
Ext: 54298
Email: gvanderm@uoguelph.ca

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

# REQUIRED TEXTBOOKS

The required textbooks for this course are **Principles of Genetics** by P. Snustad and M.J. Simmons, 6th edition, and **Cell and Molecular Biology: Concepts and Experiments** by G. Karp, 6th edition. Both are published by Wiley. These textbooks are available on a 2 hour reserve in the library.

# COURSE WEB PAGE

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 Drs. Lu and van der Merwe directly, but not to be posted onto the forum. All postings deemed inappropriate will be removed.**

# COURSE FORMAT

## LECTURES

Section 1: Monday, Wednesday, Friday at 12:30PM - 01:20PM in ROZH, Room 104.
Section 2: Monday, Wednesday, Friday at 3:30PM - 4:20PM in THRN, Room 1200.
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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.

### TENTATIVE LECTURE SCHEDULE

| Lectures | Topic | Text Chapter |
|---|---|---|
| 1-3 | Regulation of Gene Expression in Eukaryotes | 19 (Snustad) |
| 4-6 | Techniques of Molecular Biology | 14 (Snustad) |
| 7-9 | Genomics | 15 (Snustad) |
| 10-12 | Applications of Molecular Genetics | 16 (Snustad) |
| 13-15 | Genetic Control of Animal Development | 20 (Snustad) |
| | **Midterm Exam (covers Lectures 1-12)<br>Saturday, February 8 at 1:30 am - 2:30 pm<br>ROZH 103 and ROZH 104 (check CourseLink for seating assignment)** | |
| 16-18 | Genetic Basis of Cancer and the Cell Cycle Control | 21 (Snustad) |
| | **Winter Break: February 17–21 -- No classes scheduled** | |
| 19-21 | Nucleus and the Cell Cycle | 8, 14 (Karp) |
| 22-25 | Endoplasmic Reticulum: Protein Synthesis, Modification, Quality Control and the Unfolded Protein Response pathways | 8 (Karp) |
| 26-27 | Vesicular Transport | 8 (Karp) |
| 28-32 | Golgi Complex and Protein Processing; Secretory and Endocytic Pathways | 8 (Karp) |
| 33-34 | Protein Import into Mitochondria, Chloroplasts and Peroxisomes | 8 (Karp) |
| 35 | Protein and Organelle Degradation | 8 (Karp) |

***** **FINAL EXAM: Time and Location to be announced *****

**<u>The final exam will cover the entire course</u>.**

Electronic recording 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.

## TUTORIALS

Weekly tutorial sessions provide help in improving your understanding of the course material by working through assignments posted on the CourseLink web page, which are based on the lectures and assigned reading materials. The assignments will be done individually and are **due at the beginning of each tutorial session. Late submissions will not be accepted**. There are seven tutorial assignments and you are required to complete six of them for 6% of your final grade (or up to 1% each). With acceptable documentation, the weight of missed tutorial assignments will be transferred to the final exam. Details regarding the assignments, times and locations of tutorials will be available on CourseLink. Any dispute regarding your tutorial marks has to be raised within one week after the marks are posted.

### TUTORIAL SCHEDULE

| Week | Topic | Assignment Number |
|---|---|---|
| 1 | Review of Prokaryotic Gene Regulation | N/A |
| 2 | Regulation of Gene Expression in Eukaryotes | 1 |
| 3 | Techniques of Molecular Biology | 2 |
| 4 | Genomics | 3 |
| 5 | **No Tutorial (Midterm Exam Week)** | |
| 6 | Applications of Molecular Genetics and Genetics Control of Animal Development | 4 |
| | **Winter Break: February 18–22** | |
| 7 | **No Tutorial** | |
| 8 | **No Tutorial** | |
| 9 | Nucleus and cell cycle | 5 |
| 10 | Endoplasmic Reticulum, Vesicular Transport | 6 |
| 11 | Golgi Complex, Secretory and Endocytic Pathways | 7 |
| 12 | **No Tutorial** | |

# COURSE EVALUATION

There will be a midterm examination on **Saturday, February 8 at 1:30 am - 2:30 pm.** The seating assignments will be posted on the CourseLink. The midterm examination is compulsory and accounts for 37% 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 January 24, or with a Gryphon Varsity event that is confirmed by the team coach. No other reasons will be accepted, including medical and compassionate reasons.**

**The final exam is a compulsory examination and will be comprehensive.**

# GRADE ASSESSMENT

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|---|---|
| Tutorial Assignments (Best 6 out of 7) | 6% |
| Midterm Exam | 38% |
| Final Exam | 56% |
| **Total** | **100%** |

## Policy for Re-grading of Midterm Exams

Students who wish to have their midterm exam re-graded must submit their exam 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.

## Undergraduate Degree Regulations and Procedures

Please refer to the University of Guelph Undergraduate Calendar: See Section VIII, entitled Undergraduate Degree Regulations and Procedures, at the link provided below for information on University policies and procedures for examination, academic misconduct and deferred final examinations. Pay specific attention to the definition of “Academic Misconduct” and the penalties that can be accrued as described in this section.
http://www.uoguelph.ca/undergrad_calendar/c08/index.shtml