MBG*2040 Foundations in Molecular Biology and Genetics

Winter 2018
Section(s): C01

College of Biological Science
Credit Weight: 0.50
Version 1.00 - January 05, 2018

---

1 Course Details

1.1 Calendar Description

This course will develop an understanding of the fundamental concepts in genetics, including patterns of inheritance, allelic variation, gene interaction, linkage, gene mapping and changes in chromosome structure and number. This will be followed by in-depth discussions on gene structure, replication, transcription, translation, recombination, mutation and DNA repair, and an introduction to gene regulation.

Pre-Requisite(s): 4.00 credits including BIOL*1090

1.2 Course Description

Course Goals:

This course will provide an introduction to the disciplines of molecular biology and genetics. The first half will serve to develop an understanding of the fundamental concepts in genetics, including patterns of inheritance, allelic variation, gene interaction, linkage, recombination, gene mapping, DNA and chromosome structure and its variations. This will be followed by an introduction to the field of molecular biology and include the topics of DNA replication, transcription, translation, mutation and DNA repair, transposable elements and gene regulation. (0.5 credits, Prerequisite: BIOL*1090)

1.3 Timetable

Lectures:

Tuesdays and Thursdays at 8:30 – 9:50 am in Rozanski Hall Room 104

Tutorials: Tutorials begin the week of January 15th. Please refer to WebAdvisor for your scheduled tutorial day, time and room.

Students are responsible for all material given in lectures and tutorials.

1.4 Final Exam

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

---

2 Instructional Support

2.1 Instructor(s)

Dr. K Yankulov
Email: yankulov@uoguelph.ca
Telephone: +1-519-824-4120 x56466
Office: SCC 3245
Office Hours: Tuesdays/Thursdays at 10:30 – 12:00, SCC 3245
(lectures 1-12)

Dr. B Meng
Email: bmeng@uoguelph.ca
Telephone: 519-824-4120 x53876
Office: SSC 4255
Office Hours: Fridays 3:00 - 5:00 pm, SSC 4255
Lectures 13-24

2.2 Instructional Support Team

Course Co-ordinator: Elspeth Smith
Email: elspeths@uoguelph.ca
Telephone: +1-519-824-4120 x56583
Office: SC1 3505

2.3 Teaching Assistants

The teaching assistants are graduate students in the Department of Molecular and Cellular Biology. Please do not contact them outside of your tutorial sessions unless they have given you a permission to do so.

---

3 Learning Resources

3.1 Required Resources(s)

Principles of Genetics (Textbook)
Principles of Genetics by P. Snustad and M.J. Simmons, 7th Edition, 2012. John Wiley and Sons, Inc. New York, NY.

This textbook is available on a 2 hour resrve in the library.

Course Website (Website)
http://courselink.uoguelph.ca
There is a CourseLink (D2L) site set up for this course. This will allow you to access the course material, post questions on the discussion board (see below), access useful websites, and check your grades. You can access this CourseLink from the link provided. Login with your username which is your Central Login ID and your password is your university email

password.

You are responsible for all information posted on the CourseLink page for MBG*2040. Please check it regularly.

3.2 4 Steps to Getting Help in MBG*2040

Step 1: Read all posted instructions relevant to your question.

Step 2: Consult the discussion board on CourseLink.

The discussion board is an open forum to promote exchange of information between students.

You are encouraged to post clear, concise questions and to try to answer other students' posts. When posting a question please use a subject line that clearly indicates the topic of your question, making it easy for other students to find topics they wish to discuss. The teaching team will monitor the discussion board and provide input when deemed appropriate.
Please keep all questions and comments relevant to the course. Offensive postings will not be tolerated.

Step 3: Post your question to the relevant discussion board on CourseLink.

Step 4: If you are not satisfied by the responses, see an instructor during office hours.

---

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Understand and predict how single-gene traits can be tracked in multigenerational pedigrees.
2. Understand that phenotype is the result of interactions between genetic and environmental factors.
3. Explain how chromosome assortment and recombination result in gametes with new allele combinations.
4. Understand how polyploidy is common in plants and rare in animals.
5. Explain how chromosomal nondisjunction events can cause aneuploidy.
6. Describe and discuss how structural changes in chromosomes can have medical and evolutionary significance.
7. Understand and describe the processes of DNA replication, transcription and RNA processing, translation and the genetic code.
8. Explain factors that contribute to genetic mutations and describe repair mechanisms and recombination events.
9. Describe bacterial genetics, viruses and transposons.
10. Understand the basic principles of genetic regulation.

---

5 Teaching and Learning Activities

5.1 Lecture

Topic(s): Lecture Schedule

A provisional schedule of lecture topics and text chapter readings can be found below. Material given in the lectures is the responsibility of the student. Students are expected to attend all lectures and all tutorials. If you miss a lecture or tutorial, you should get the notes from another student in the course. Electronic recording of classes is expressly forbidden without prior consent of the instructors. 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 written consent of the instructors.

Week	Lecture	Lecture Topic	Text Chapters
Jan.8th Jan.15th	1-4	Review of Mendelian Genetics, Extensions of Mendelism	4
Jan.22nd	5-6	Variation in Chromosome Number and Structure	6
Jan.29th	7-8	Linkage and Recombination	7
Feb.5th	9-10	Bacterial Genetics	8
Feb.12th	11-12	DNA and the Molecular Structure of Chromosomes	9
		Feb. 19th - 23rd WINTER BREAK	
Feb.26th	13-14	DNA Replication	10
		Midterm Exam – covers lectures 1–10	
		Saturday, March 3rd, 4:00 pm – 5:30 pm, ROZH	
Mar.5th	15-16	Transcription and RNA Processing	11
Mar.12th	17-18	Translation and the Genetic Code	12
Mar.19th	19-20	Mutation, Repair and Recombination	13
Mar.26th	21-22	Transposable Elements	17

Apr.2nd 23-24 Gene Regulation

Final Exam – covers lectures 11-24

Monday, April 18, 7:00 pm – 9:00 pm, Location TBA

5.2 Seminar

Topic(s): Tutorial and Online Quiz Schedule

The MBG*2040 tutorials are designed to reinforce concepts and terminology introduced in lectures and to improve problem solving skills. Tutorials will consist of one in class assignment. During the tutorial, students will work though the assignment with the assistance of the Teaching Assistants, and hand it in at the end of tutorial. You are responsible for ALL material covered in tutorials. There are 9 tutorial sessions each with a corresponding assignment. Assignments are posted on Courselink in advance of each tutorial. Students must print out each assignment and bring it to tutorial. Assignments are marked for completion by the Teaching Assistants and worth a total of 7% of the final mark (best 7 of 9). See the schedule below for tutorial topics and dates.

Online quizzes open on Fridays at 4:30 pm each week of tutorial. They are designed to both assess your knowledge on the tutorial and lecture material for each unit as well as provide practice for the midterm and final. Each quiz will be 30 min. in length and consist of 10 multiple choice or True/False questions. Quizzes will be available for one week, closing on the following Thursday at 11:59 pm. Quizzes are worth a total of 14% of the final mark (best 7 of 9). Once each quiz closes you will be able to see your incorrect responses. At this time the quizzes will re-open as a midterm/final exam practice tool and you will have unlimited attempts for each quiz, however your original quiz grade will be final. Any questions regarding the online quizzes can be directed to the course coordinator.

Any dispute regarding your tutorial or quiz grade must be brought to the attention of the Course Coordinator within one week after the grade has been posted on CourseLink.

NOTE: 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 will be considered academic misconduct. Please refer to the section on Acedemic Integrity below for more information regarding expectations and penalties.

Week of	Topic	Quiz Opens/Closes
Jan. 8th	No tutorials scheduled	
Jan. 15th	Tutorial 1: Review questions on Mendelian principles	Quiz 1: Jan.19/25
Jan. 22nd	Tutorial 2: Extensions of Mendelism	Quiz 2: Jan.26/Feb.1
Jan. 29th	Tutorial 3: Variation in Chromosome Number and Structure	Quiz 3: Feb. 2/8

Feb. 5th	Tutorial 4: Linkage and Recombination	Quiz 4: Feb. 9/15
Feb. 12th	Tutorial 5: Bacterial Genetics	Quiz 5:Feb. 16/28
Feb. 19th	WINTER BREAK - No Tutorials	
Feb. 26th	No tutorials – Midterm Mar. 3rd	
Mar. 5th	Tutorial 6: DNA Replication	Quiz 6: Mar. 9/15
Mar. 12th	Tutorial 7: Transcription	Quiz 7: Mar. 16/22
Mar. 19th	Tutorial 8: Translation	Quiz 8: Mar. 23/29
Mar. 26th	Tutorial 9: Mutation	Quiz 9: Mar. 30/Apr. 5
Apr. 2nd	No tutorials	

5.3 Important Dates

Jan. 9th	First lecture
Feb. 19-23	Winter Break - no lectures or tutorials scheduled
Mar. 3rd	Midterm exam **- ROZH**
Mar. 9th	40th class day – Last day to drop courses
Apr. 6th	Last lecture
Apr. 18th	Final exam

---

6 Assessments

Grades will be assigned according to the standards outlined in the U of G Undergraduate Calendar (p40H41).

6.1 Assessment Details

Tutorial Assignments (7.00%)
Date: In scheduled tutorials
Best 7 out of 9

Online Quizzes (14.00%)

Date: Open each week of the associated tutorial
Best 7 out of 9

Midterm Examination (35.00%)

Date: Sat, Mar 3, ROZH

The midterm exam is scheduled on Saturday, Mar. 3rd at 4:00 pm – 5:30 pm. This exam will test you based on lectures 1-10. The midterm exam is **compulsory** and will count for 35% of your final grade. The format of this exam will be multiple choice and short answer. Alternate times will be set for midterm exams if there is a direct conflict with another course or with a Gryphon Varsity event that is confirmed by the coach. **Conflicts of this nature must be reported to the instructor by February 2nd.** If a student does not write the midterm exam they will receive a grade of 0% unless proper documentation is provided in person to the instructor **by 4:30 on Wednesday march 7th .** In cases with proper documentation, **an alternate time will be set up to write the midterm.**

Final Exam (44.00%)

Date: Mon, Dec 4, TBA

The final exam is scheduled on Wednesday April 18th, at 7:00pm – 9:00pm. The final exam is a compulsory examination and will cover content from lectures 11-24. The format of this exam will be multiple choice and short answer.

6.2 Missed Tutorials or Quizzes

The mark for your tutorials and quizzes will be calculated from your best 7 of 9 marks. The first two missed tutorials or quizzes will be dropped as your lowest mark regardless of the reason for absence. If more than two tutorials or quizzes are missed the weight of either one can be transferred to the weight of the exam provided acceptable documentation has been received. Acceptable documentation must be received before the last day of classes and should be emailed to the course coordinator. Please note that the tutorials and quizzes are separate grade items therefore you can write a quiz even if you miss the corresponding tutorial.

6.3 Academic Consideration

https://www.uoguelph.ca/registrar/calendars/undergraduate/20152016/c08/c08-ac.shtml

---

7 Course Statements

7.1 Grading

If you are absent from classes during the semester, you will be expected to make up missed lecture and tutorial material on your own.

7.2 Exam Procedure

Do not bring laptops, phones or other electronic devices to exams. Leave your phone at home or in your knapsack. If it is in your knapsack, make sure it is turned off. Phones that ring during exams will be put outside of the examination room. You are expected to bring a calculator to every exam. We do not provide calculators nor do we allow students to share calculators. You will be required to provide photo ID during exams.

---

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.

---

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.

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.