



MBG*2040 Foundations in Molecular Biology and Genetics

01

Fall 2022

Section(s): 01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - September 06, 2022

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-Requisites: 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, and gene regulation. (0.5 credits, Prerequisite: BIOL*1090)

1.3 Timetable

Lectures:

Section 1: M, W, F - 10:30 am - 11:20 am in ROZH 104

Section 2: M, W, F - 1:30 pm – 2:20 pm in WMEM 103

*Note Lectures times and Locations subject to change, please check WebAdvisor for the most up to date information.

Seminars: There are 10 seminars throughout the semester beginning the week of Sept.12th. Please refer to WebAdvisor for your scheduled tutorial/seminar day, time and room.

Online Quizzes: Online quizzes are held each week that seminars run. Ideally students write the quizzes after completing their seminar in order to be fully prepared. Quiz 1 opens Sept. 12th. See the Activities section for a full description and schedule.

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

1.4 Final Exam

Online Exam: December 13th, 11:30 am - 1:30 pm, requires Respondus Monitor and webcam.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Dr. Jim Uniacke
Email:	juniacke@uoguelph.ca
Office:	SSC2244
Office Hours:	Office hours will be held via Zoom on Mondays from 11:30 am - 1:30 pm (link can be found on CourseLink) and in-person Wednesdays from 11:30 am - 1:30 pm in SSC2244 beginning Sept 14th. The Zoom link can be accessed from the main navigation bar in the MBG 2040 CourseLink site.

In-person or virtual appointments are possible by appointment.

Attend these office hours for questions regarding Dr.

Uniacke's lecture material.

Dr. Uniacke is the instructor for the first half of MBG*2040, lectures 1-18 inclusive. Lecture slides will be posted before class.

Instructor: Dr. Muhammad Zaman
Email: mzaman02@uoguelph.ca
Office: Room SSC 4441
Office Hours: In person office Office hours: Tuesdays and Thursdays 12.00 pm to 2.00 pm.

Attend these office hours for questions regarding the Dr. Zamans lecture material.

Dr. Zaman is the instructor for the second half of MBG*2040, lectures 19 - 36 inclusive.

Course Co-ordinator: Dr. Satinder Gidda
Email: sgidda@uoguelph.ca
Telephone: 519-824-4120 ex. 53795
Office: SSC Room 3520
Office Hours: In-person Office Hours: Wednesdays 2.30pm to 4.30pm in room SSC 3520 - beginning Sept 14th.

Attend office hours for questions regarding the seminar materials or quizzes.

2.2 Teaching Assistants

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

3 Learning Resources

3.1 Required Resources

Introduction to Molecular Biology, Cell Biology and Genetics (Textbook)

Introduction to Molecular Biology, Cell Biology and Genetics (Textbook). Department of MCB, University of Guelph Custom Text for BIOL 1090/MBG 2040/MCB 2050 - MacMillan. 2021. MBG*2040 uses selected chapters from the Pierce - Genetics: A Conceptual Approach portion of the custom textbook package. This textbook package can be purchased at the U of G Bookstore or Co-op Bookstore. It includes a hard copy of the custom text as well as **4 years** of access to the digital platform ACHIEVE which includes the e-book and additional learning resources. A digital only version of this package is also available.

All students who took BIOL 1090 in F21 or W22 will have already purchased this textbook and therefore they DO NOT need to purchase a text for MBG*2040. If you purchased the textbook before F21, please check the course CourseLink page for a new access code and instructions to set up your digital ACHIEVE access for both the text and the digital resources required for MBG*2040. Questions regarding the MBG*2040 textbook package can be directed to the course coordinator Satinder Gidda at sgidda@uoguelph.ca.

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. Inappropriate 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 and viruses.
 10. Understand the basic principles of genetic regulation.
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5 Teaching and Learning Activities

5.1 Lecture

Topics: 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 seminars. **Lecture Schedule is subject to modification.**

Lecture Lecture Topic

Pierce - 7th ed.

Text Chapters

1-5 Review, Extensions and Modifications of Basic Principles 3, 4.3, 6, 5, 25.2

Lecture	Lecture Topic	Pierce - 7th ed.
		Text Chapters
6-8	Chromosome Variation	8
9-12	Linkage and Recombination	7
13-15	Bacterial and Viral Genetic Systems	9
16-18	DNA and Chromosome Structure	10-11
19-21	DNA Replication	12
22-25	Transcription and RNA Processing	13-14
26-28	The Genetic Code and Translation	15
29-33	Gene Mutations and DNA Repair	18
34-36	Control of Gene Expression in Bacteria	16

5.2 Seminar

Topics: Seminar and Online Quiz Schedule

Seminars: The MBG*2040 seminars are designed to reinforce concepts and terminology introduced in lectures and to improve problem-solving skills. Seminars are in person - please refer WebAdvisor to know the date, time and location for your section's seminar. Each week a seminar assignment will be posted under the Seminars tab in CourseLink. Students should download and review this assignment *before* their designated seminar time. Seminars are led by Teaching Assistants who will assist the students as they complete the assignments. Completed assignments should be kept as study guides for the midterm and final exams.

Seminar Marks: There are 10 seminar assignments throughout the semester. Seminar marks are based on both attendance and participation. Each seminar is worth 1% of the final grade. The best 7 out of 10 marks make up the overall Seminar grade for a total of 7%.

Students must attend the seminar which they are registered for and will not receive marks for attending an incorrect section. Students are responsible for ALL material covered in seminars.

Online Quizzes: There are a total of 10 online quizzes which open each week, Mondays at 12:00 am and close that Friday at 11:59 pm. These quizzes are designed to both assess your knowledge of the seminar and lecture material for each unit, as well as provide practice for the midterm and final. Each quiz will be 60 min. in length and consist of 10 multiple choice, True/False, or short answer questions.

Quizzes are worth a total of 21% of the final mark (3% each, best 7 of 10). Once each quiz closes you will be able to review your incorrect responses. 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 should be directed to Satinder Gidda, the Course Coordinator: sgidda@uoguelph.ca.

Any dispute regarding your Seminar 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: 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).

Posting any Seminar 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 Academic Integrity below for more information regarding expectations and penalties.

Week of	Topic	Quiz Opens/Close Dates
Sept. 7	No seminar/quiz	All quizzes open at 12:00 am/ close at 11:59 pm on the dates listed
Sept. 12	Seminar 1: Review Basic Principles of Heredity and Pedigrees	Quiz 1: Sept. 12th/16th

Sept.19 Seminar 2: Extensions of Mendelism Quiz 2: Sept. 19th/23rd

Sept.26 Seminar 3: Variation in Chromosome Number and Structure Quiz 3: Sept. 26th/30th

Oct. 3 Seminar 4: Linkage and Recombination Quiz 4: Oct. 3rd/7th

Oct. 10 **FALL STUDY BREAK - No seminar/quiz**

Oct. 17 Seminar 5: Bacterial and Viral Genetics Quiz 5: Oct. 17th/21st

Oct. 24 Seminar 6: Career Readiness: Skill Identification and Development Quiz 6: Oct. 24/Nov. 25

**Midterm: Sat. Oct. 29th, 10.00 am - 11:30 am , online
requires Respondus Lockdown and Webcam**

Oct. 31 Seminar 7: DNA Replication Quiz 7: Oct. 31st/Nov. 4th

Nov. 7 Seminar 8: Transcription Quiz 8: Nov. 7th/11th

Nov.14 Seminar 9: Translation Quiz 9: Nov.14th/18th

Nov. 21 Seminar 10: Mutation Quiz 10: Nov. 21st/25th

Nov. 28 **No seminar/quiz**

Dec13 **Final Exam: Online, Time 11.30am-1.30pm**

6 Assessments

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

6.1 Assessment Details

Seminars (7%)

Date: During weeks with scheduled Seminars (10 total)

Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Best 7 out of 10

Students must attend the seminar section which they are registered for AND participate in class to receive the seminar mark.

Online Quizzes (21%)

Date: Open each week of the associated seminar, Mon. 12:00 am/ Close that Friday, 11:59 pm

Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

The quizzes cannot be extended beyond the 5 day period they are open. Students with medical or compassionate issues that cover the entire one-week period the quiz is open will be granted a changed mark weighting.

Best 7 out of 10

Midterm Examination (30%)

Date: Sat, Oct 29, 10:00 AM - 11:30 AM, Online

Learning Outcome: 1, 2, 3, 4, 5, 6

The midterm exam will be held online on **Sat. Oct 29th, 10.00 am - 11:30 am**. This exam requires the use of *Respondus* software and a webcam. This exam will cover content from lectures 1-18 and seminar assignment 1-5. The midterm exam is **compulsory** and will count for 30% of your final grade. The format of this exam will be multiple choice. 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. Only one alternative date will be provided. **Conflicts of this nature must be reported to the course coordinator no later than Friday Sep 30th.** If a student does not write the midterm exam they will receive a grade of 0% unless proper documentation is provided to the course coordinator **by 4:30pm on Wed. Nov. 2nd.** In case of proper documentation, the final exam will be reweighted to 72%. Documents must be provided to the course coordinator to be considered.

Final Exam (42%)

Date: Tue, Dec 13, 11:30 AM - 1:30 AM, Online

Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

The final exam will be held online on **Tues. Dec 13th, 11:30 am - 1:30 pm**. The final exam is a compulsory examination and will cover content from the entire course. The format of

this exam will be multiple choice and short answer.

This exam requires the use of *Respondus* software and a webcam. All students will require reliable internet access and a webcam. More details will be provided on CourseLink.

6.2 Missed Seminars or Quizzes

The mark for your Seminars and quizzes will be calculated from your best 7 of 10 marks. The first three missed seminars or quizzes will be dropped as your lowest mark regardless of the reason for absence. If more than three seminars 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 needs to be sent to the course coordinator within 1 week of your missed assessment. Please note that the Seminars and quizzes are separate grade items therefore you can write a quiz even if you miss the corresponding Seminar.

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 seminars during the semester, you will be expected to make up the missed material on your own.

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.selfregulationskills.ca/>

8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar. (<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course

format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

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 grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

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 encourages academic integrity. 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.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, 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 that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

9.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
