



MBG*3660 Genomics

Winter 2024

Section(s): 01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - January 05, 2024

1 Course Details

1.1 Calendar Description

This course examines the genomes of eukaryotes and prokaryotes including how genomes are mapped and sequenced, the function of the genome and ethical issues arising from genomic information. How genomic data is used for understanding and treating human disease and for the study of evolution will also be discussed.

Pre-Requisites: MCB*2050

1.2 Course Description

This course examines how genome projects are generated through mapping and sequencing. We will also examine the various information generated from eukaryotic and prokaryotic genomic projects, including transcriptomics, polymorphisms, proteomics. Finally we will explore how genomic data is used for understanding and treating human disease and for the study of evolution.

1.3 Timetable

Lectures will be uploaded to CourseLink the night before the lecture. Face to face lectures are Tuesdays and Thursdays from 10:00 to 11:20 AM in THRN 1307. This may change so please confirm with WebAdvisor before the start of class.

Please Note: All times reported are reported in Eastern Time (Guelph, Ontario, Canada).

1.4 Final Exam

Final Exam is Tuesday, April 23, 2024 from 8:30-10:30AM

Location TBD

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Terry Van Raay
Email:	tvanraay@uoguelph.ca
Office:	SSC 3247
Office Hours:	Office hours will Thursdays from 2:-3:00pm in SSC 3247.

2.2 Teaching Assistants

Teaching Assistant (GTA):	Andrew Dolson
Email:	dolsona@uoguelph.ca
Teaching Assistant (GTA):	Marina Figueira
Email:	figueira@uoguelph.ca

3 Learning Resources

3.1 Required Resources

CourseLink (Website)

CourseLink (<https://courselink.uoguelph.ca>) powered by D2L's Brightspace is the course website and will act as your classroom. It is recommended that you log in to your course website every day to check for announcements, access course materials, and review the content.

There is no required textbook for this course. However, you might find the following textbook resources helpful with some of the material. They will be on reserve in the library

3.2 Additional Resources

Genomes 4 (Textbook)

T. A. Brown, Published by Garland Science, Copyright Year 2018.

On reserve in the library

Discovering Genomics, Proteomics and Bioinformatics (Textbook)

2nd Edition by A. Malcolm Campbell and Laurie J. Heyer.

On reserve in the library

3.3 Supplementary Resources

Supplemental readings as well as relevant announcements will be posted on CourseLink.

4 Learning Outcomes

Overall, the course objective for students is to have an appreciation and understanding of different 'omics' projects, be it population genomics, transcriptomics or proteomics.

4.1 Course Learning Outcomes

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

1. Demonstrate the strategies involved in completing a genomics project.
 2. Explain the different types of information that can be obtained from a genome project (eg., aneuploidy or genome evolution).
 3. Challenge the ethical issues surrounding human genome projects and the concept of personalized medicine.
 4. Integrate different databases, such as a genome browser and its associated databases (eg. Human Genome Browser) with other databases (eg., Genbank), and synthesize the various elements displayed in these databases.
 5. Apply information gathered from databases to a gene of interest.
 6. Explain the basics of mass spec and its application to the 'omics' field.
 7. Understand the methods used to manipulate a genome.
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5 Teaching and Learning Activities

- This course will be run using CourseLink.
- CourseLink is used for posting marks and to provide access to lecture slides.
- Major course components:
 - Lecture
 - Computer exercises
 - Individual student projects
 - Examinations

5.1 Lecture

Topics:

Week	Topic
1	Introduction, Mapping
2	Genome sequencing and annotation
3	Genomic contents
4	Comparative Genomics
5	Genome Sequencing Technologies
6	Transcriptomes
7	Principle Component Analysis and False Discovery Rates
8	Expression databases and Gene Ontology
9	Gene regulation
10	Gene regulation
11	Proteomics
12	Genome manipulation

6 Assessments

The course evaluation is divided into the following sections listed below.

Assessment due dates and times reported in this course outline and in CourseLink are in Eastern Time (Guelph, Ontario, Canada). Please ensure that when completing course assignments that the documents are submitted by the due date and time as indicated in the course schedule.

NOTE: These assessments are subject to change but will be solidified by the beginning of class.

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Assignment #1	6
Assingment #2	6
Assignment #3	6
Assignment #4	6

Name	Scheme A (%)
Assignment #5	6
Assignment #6	6
Midterm 1	16
Midterm 2	16
Final Exam	32
Total	100

6.2 Assessment Details

Assignments (36%)

Date: Mondays by 11:59pm

Learning Outcome: 1, 2, 4, 5, 7

There will be 7 assignments of which you need to complete 6, each worth 6%. 36% of your total mark.

They will be due in Dropbox on Monday evenings by 11:59 pm.

Midterm 1 (16%)

Date: in class

Learning Outcome: 1, 2, 4

Date: TBD

Midterm 1 will be held during class time. It will be worth 16% of your final mark

Midterm 2 (16%)

Learning Outcome: 4, 5

Date: TBD

Midterm 2 will be held in class. It will be worth 16% of your final mark

Final Exam (Comprehensive) (32%)

Date: Wed, Apr 19, 8:30 AM - 10:30 AM, location TBD

Learning Outcome: 1, 2, 3, 4, 5, 6, 7

The final exam will cover the entire semester. It will be in person.

7 Course Statements

7.1 Submission of Assessments to Dropbox

Assessments for this course should be submitted electronically via the online Dropbox tool. When submitting your file using the Dropbox tool, do not leave the page until your file has successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully. The system will also email you a receipt. Save this email receipt as proof of submission.

Be sure to keep a back-up copy of all of your files in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommend you save your files to a cloud-based file storage (e.g., Google Docs), or send to your email account, so that should something happen to your computer, the file could still be submitted on time or re-submitted.

It is your responsibility to submit your documents on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. Remember that technical difficulty is not an excuse not to turn in your assignment on time. Don't wait until the last minute as you may get behind in your work.

If, for some reason, you have a technical difficulty when submitting your file electronically, please contact your instructor or CourseLink Support prior to the deadline.

7.2 Late Assessments

It is your responsibility to submit your assessments on time as specified on the schedule. Remember that technical difficulty is not an excuse not to turn in your assessment on time.

Penalties for late assignments are assessed at 10% per day. For example, an assignment due at 10:10 a.m. submitted at 10:11 a.m. is considered one day late and will be assessed a late penalty of 10%. If it is handed in at 10:10 a.m. the following day it is also considered one day late and will be assessed a 10% penalty. Submissions received after 5 days will not be accepted and will receive a grade of zero. Please note, it is the student's responsibility to ensure the assessment file is submitted in the correct format.

7.3 Netiquette Expectations

For this course the same protections, expectations, guidelines, and regulations used in face-to-face settings apply, plus other policies and considerations that come into play specifically because these courses are online.

Inappropriate online behaviour will not be tolerated. Examples of inappropriate online

behaviour include:

- Posting inflammatory messages about your instructor or fellow students;
- Using obscene or offensive language online;
- Copying or presenting someone else's work as your own;
- Adapting information from the Internet without using proper citations or references;
- Buying or selling term papers or assignments;
- Posting or selling course materials to course notes websites;
- Having someone else complete your quiz or completing a quiz for/with another student;
- Stating false claims about lost quiz answers or other assignment submissions;
- Threatening or harassing a student or instructor online;
- Discriminating against fellow students, instructors, and/or TAs;
- Using the course website to promote profit-driven products or services;
- Attempting to compromise the security or functionality of the learning management system; and
- Sharing your username and password.

7.4 Course Email Policy

All communications must contain an appropriate subject line. The body of the email must contain your name, student number and course number. The email must have text with complete sentences, correct spelling, and proper grammar. Overall, it should have a professional tone. Failure to have any of the aforementioned criteria may result in the instructor not responding to the message. The instructor will attempt to respond to emails within 48-72 hours, not including weekends/holidays. Note, non-uoguelph emails may not be addressed.

Please note that course related issues will not be acknowledged/resolved by phone.

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 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).
