MBG*3660 Genomics

Winter 2018
Section(s): C01

Department of Molecular and Cellular Biology
Credit Weight: 0.50
Version 1.00 - January 09, 2018

---

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-Requisite(s): 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

- Tuesdays & Thursdays, 10:00 - 11:20 AM in MCKN 031

1.4 Final Exam

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

Currently set for Thursday, April 19, 2018 from 2:30-4:30

---

2 Instructional Support

2.1 Instructor(s)

Terry Van Raay
Email: tvanraay@uoguelph.ca
Telephone: +1-519-824-4120 x52864

Office:	SSC 3247
Office Hours:	Thursdays from 2:00-3:30pm

2.2 Teaching Assistant(s)

Teaching Assistant:	Cameron Nugent
Email:	nugentc@uoguelph.ca
Office Hours:	Cam will have the following office hours to assist with the 3 assignments.

All office hours will be in **SSC 3501** as follows:

Assignment #1 (due Monday, January 29 at midnight):

Friday Jan 26th from 1-2

Monday Jan 29 from 3-4

Assignment #2 (due Friday, February 16 at midnight):

Thursday, February 15 from 1-2pm

Friday, February 16 from 3-4 pm

Assignment #3 (due Monday, March 19 at midnight):

Friday, March 16 from 1-3 pm

Monday, March 19 from 2-5 pm

---

3 Learning Resources

There is no required textbook for this course. However, I will be using information primarily from two textbooks, which will be on reserve in the library.

3.1 Recommended Resource(s)

Discovering Genomics, Proteomics and Bioinformatics (Textbook)

- Discovering Genomics, Proteomics and Bioinformatics, 2nd Edition, by A. Malcolm Campbell and Laurie J. Heyer
- On reserve in the library

Genomes 3 (Textbook)

- Genomes 3, T.A. Brown
- On reserve in the library

---

4 Learning Outcomes

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

4.1 Course Learning Outcomes

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

1. Describe the history of the human genome project.
2. Demonstrate the strategies involved in completing a genomics project.
3. Explain the different types of information that can be obtained from a genome project (eg., aneuploidy or genome evolution).
4. Challenge the ethical issues surrounding human genome projects and the concept of personalized medicine.
5. 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.
6. Apply information gathered from databases to a gene of interest.
7. Explain the basics of mass spec and its application to the 'omics' field.
8. Understand the methods used to manipulate a genome.

---

5 Teaching and Learning Activities

- This course will be run using CourseLink.
- Major course components:
  - Lecture
  - Computer Excercises
  - Individual Student project
  - Student presentations

5.1 Schedule

Week	Dates	Topics Covered in Lecture and Important Dates (tentative and subject to change)	Personal Presentation Numbers
1	January 9th and 11th	Introduction and Overview of Topics. Mapping: Genetic and Physical Maps	
2	January 16th and 18th	Mapping Huntington's Disease. Genome Sequencing Project	
3	January 23rd and 25th	Genome Annotation. Exploring the various genomic databases.	1-5
	Monday, January 29th	**Assignment #1 due at midnight in DropBox**	
4	January 30th and Feb1st	What's in a genome? Finding genes and other stuff. Other genomic projects and Genome evolution.	6-15
5	February 6th and 8th	Exploring the UCSC Genome Browsers.	16-25
6	February 13th and 15th	Genome Evolution and Prokaryotic genomes Prokaryote Genomes, Yeast genome.	26-35
	Friday, February 16th	**Assignment #2 due at midnight in DropBox**	
7	February 27th and Mar 1st	Microarrays.	36-45
8	March 6th and 8th	Aneuploidy and Proteomics.	46-55
9	March 13th and 15th	Manipulating the Genome.	56-65
	Monday, March 19th	**Assignment #3 due at midnight in DropBox**	
10	March 20th and 22nd	Quantitative Proteomics.	66-75
11	March 27th and 29th	Metabolomics, Epigenomics.	76-85
12	April 3 and April 5th	Comprehensive Genomic analysis.	86-90

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Assignment #1	12.00
Assignment #2	13.00
Assignment #3	25.00
Genomics Presentation	10.00
Final Exam (Comprehensive)	40.00
Total	100.00

6.2 Assessment Details

Assignment #1 (12.50%)
Date: Mon, Jan 29

- Course Content:
  - Computer Excercises
  - Idependent learning

Assignment #2 (12.50%)
Date: Fri, Feb 16

- Course Content:
  - Computer Excercises
  - Independent Learning

Assingment #3 (25.00%)
Due: Mon, Mar 19

- Course Content:
  - Computer Excercises
  - Independent leaning

Genomics Presentation (10.00%)
Date: During lecture throughout the semester

- Course Content:
  - Computer Excercises
  - Independent learning

Final Exam (Comprehensive) (40.00%)
Date: Thu, Apr 19, 2:30 PM - , 4:30 PM, TBA

- Course Content:
  - Lecture based material

6.3 Important Dates

Due in Dropbox:

- Assignment #1: Monday, January 29th by 12:00 midnight in Dropbox
- Assignment #2: Friday, February 16th by 12:00 midnight in Dropbox
- Assignment #3: Monday, March 19th bu 12:00 midnight in Dropbox
- Final Exam:, Thursday, April 19, 2:30-4:30
- Dropdate without a penalty: Friday, March 9th

---

7 Course Statements

7.1 Late Assignments & Missed Presentations

- Late assignments will be penalized 5 percentage points for every 24 hour period starting at 12:01 AM on the day after the assignment is due. For example, if an assignment is marked out of 55, then 2.75 marks will be deducted for every 24 hour period.
- Missed presentations will be deducted 2 points and rescheduled to the next lecture.

---

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.uoguelph.ca/~ksomers/

---

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.