



MBG*3050 Human Genetics

Winter 2021

Section(s): C01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - January 20, 2021

1 Course Details

1.1 Calendar Description

This course is designed to introduce the student to the study of biological inheritance in humans. The course includes discussion of the genetic basis of human individual differences, gene frequencies in human populations, human behavioral genetics, human cytogenetics, biochemical genetics and developmental genetics, medical genetics and other aspects of human heredity.

Pre-Requisites: MCB*2050

1.2 Course Description

All aspects of this course will be delivered online.

This course is designed to provide students with advanced study into biological inheritance in humans. Topics include the genetic basis of individual differences, human origins, developmental genetics, cancer genetics and aging. We will also discuss research strategies for identifying and studying genes responsible for diverse functions and traits, as well as approaches to treating human disease, personalized medicine and the application and consequences of modern genetic technologies in our society. This course will consist of a series of lectures and presentations by student groups, as well as complementary laboratory modules.

1.3 Timetable

Lectures:

Monday, Wednesday and Friday from 11:30 am -12:20 pm, virtual. Lecture notes will be

posted on Courselink in advance. Zoom links to lecture recordings will be posted at class time.

Presentations:

Will be held via Zoom during class time - see schedule on Courselink for details.

Laboratories:

Alternating weeks on Tuesday or Wednesday from 2:30-5:20 pm, virtual. See Courselink for details.

1.4 Final Exam

Online, April 22, 7-9pm

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Nina Jones
Email:	jonesmcb@uoguelph.ca
Telephone:	+1-519-824-4120 x53643
Office:	SSC 3461
Lab Co-ordinator:	Jenna Penney
Email:	penneyj@uoguelph.ca

3 Learning Resources

3.1 Required Resources

Courselink (Website)

<https://courselink.uoguelph.ca>

This course will make use of the University of Guelph's course website on D2L (via Courselink). Consequently, you are responsible for all information posted on the Courselink page for MBG*3050. Please check it regularly.

3.2 Recommended Resources

Human Molecular Genetics 4e or 5e (Textbook)

Recommended Textbook: Tom Strachan and Andrew P. Read, 2011. *Human Molecular Genetics* (4th edition*). (HMG4) Garland Publishing.

- Copies of the 4th edition are available in the UofG Bookstore and on 2-hour reserve at McLaughlin Library.
- *Please note that a 5th edition was released in December 2018 and is available for purchase through online retailers. Updates from this text will be incorporated.

3.3 Additional Resources**Reserve material (Textbook)**

Additional textbooks available on 2-hour reserve at McLaughlin Library:

- Nussbaum, McInnes, Willard, 2007. *Genetics in Medicine*. Saunders Elsevier
- Scott Gilbert, 2010. *Developmental Biology* (9th edition). Sinauer Associates.
- Ian Young, 2005. *Medical Genetics*. Oxford University Press.

4 Learning Outcomes**4.1 Course Learning Outcomes**

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

1.
 - Describe the nature of genetic material
 - Understand transmission/patterns of inheritance
 - Discuss the molecular biology underpinning gene function
 - Describe mechanisms of gene expression and regulation
 - Explain how genetic variation arises
 - Describe processes of population genetics that influence evolution
 - Understand the benefits and limitations of using model organisms in genetics
 - Explain modern methods and tools in genetics

Students should also be able to:

- Locate, read and comprehend primary research papers on genetics

- Design experiments using appropriate controls and sample sizes
- Apply statistical methods when analysing data
- Generate and interpret graphs displaying experimental results
- Communicate experimental findings in lab reports and oral presentation
- Effectively explain genetics concepts to different audiences
- Identify and critique scientific issues relating to society or ethics

The learning outcomes for this course have been developed in line with core concepts and competencies established by the Genetics Society of America Education Committee.

5 Teaching and Learning Activities

5.1 Lectures

Lectures will be pre-recorded using PowerPoint format and posted on Courselink. Class time slots (Monday, Wednesday, Friday 11:30 am-12:20 pm) will be used for specialized instructor-led sessions and group presentations. More information will be provided in the first week of the semester.

5.2 Laboratories

There will be four virtual laboratories with one lab session every other week: Tuesday or Wednesday. More information is available on Courselink with a complete lab schedule and assignment due dates for each section.

5.3 Formal scientific lab report

You are required to write one lab report for this course (worth 20% total). It will cover the content explored in lab 4, comparing p53 gene and protein levels in normal and cancer cells (worth 15%). An optional draft report (worth 5%) is to be submitted in advance of the deadline. Instructions and rubrics will be provided.

5.4 Quizzes

Each lab will have an online quiz (available via Courselink) which is to be completed after your scheduled lab (worth 10% total, best 4 of 5 quiz grades will be tallied).

5.5 Presentation

Date and topic to be selected/assigned in the first two weeks of class (worth 10% total). Students will work in groups of four and each presentation will be ~12 minutes in length, with ~3 minutes for questions. Students will be asked to prepare a summary with key terms and points, as well as questions that can be used for the final exam. Students will sign up in the first week of the semester. Detailed instructions for the presentation will be posted in a separate document on Courselink.

5.6 Tentative lecture topics

- Chromosome structure and function
- Patterns of single gene inheritance
- Multifactorial inheritance
- Human genome variation
- Human evolutionary genetics
- Identifying human disease genes
- Early human development
- Developmental genetics
- Genetics of sex determination
- Stem cells and organoids
- Cancer genetics
- Genetic testing
- Model organisms and modelling disease
- Genetic approaches to treating disease
- Personalized medicine

5.7 Tentative lecture schedule

A detailed schedule will be posted in a separate document on Courselink.

6 Assessments

6.1 Marking Schemes & Distributions

Course Evaluation and Exam Dates:

Assessment	Weight (% final grade)	Date/Location
Midterm Exam	25%	Online, February 12, 11:30am - 12:20pm
In-class Presentation	10%	see schedule on Courselink, online in class time
Lab Reports	20%	see schedule in Lab manual
Lab Quizzes	10%	see schedule in Lab manual
Final Exam	35%	Online, April 22, 7 - 9pm

7 Department of Molecular and Cellular Biology Statements

7.1 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](#)

7.2 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>

7.3 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/>

7.4 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 University Statements

8.1 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.

8.2 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>

8.3 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>

8.4 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.

8.5 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.

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>

8.6 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>

8.7 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.

8.8 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>

8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

8.10 Illness

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.
