



BIOC15 – Genetics

Summer 2021

Lecture Wed 12:00PM – 2:00PM

Lab1 Wed 2:00PM – 5:00PM

Lab2 Th 10:00AM – 1:00PM

Lab3 Th 2:00PM – 5:00PM

This course will be delivered entirely online

| | | | |
|-----------------------------|---|----------------------|-----|
| Instructor: | Dr. Kristen Brochu kristen.brochu [at] utoronto.ca | Online Office Hours: | TBA |
| Teaching Assistants: | Aeen Ebrahim Amini aeen.ebrahimamini [at] mail.utoronto.ca | Online Office Hours: | TBA |
| | Jenan Nouredine jenan.nouredine [at] mail.utoronto.ca | Lab Section: | TBA |
| | Marc Shenouda marc.shenouda [at] mail.utoronto.ca | Online Office Hours: | TBA |
| | | Lab Section: | TBA |

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

COURSE DESCRIPTION

Genetic variation is the basis for all the wondrous diversity of life, and its study can help us to answer questions as varied as why siblings look alike, to why some people are more prone to a particular disease. In this course, we will cover the fundamentals of mutations, inheritance, and gene interactions with a focus on the techniques used to understand these phenomena.

COURSE GOALS & OUTCOMES

The goal of this course is to provide all students with foundational knowledge on the basic principles of inheritance and genetic applications. By the end of the course, you will be able to:

- 1) Discuss the significance of Mendel's laws and how they shaped genetics as we know it
- 2) Summarize the role of chromosomes in inheritance, and explain the importance of segregation of alleles, independent assortment, sex linkage and linkage
- 3) Analyze pedigree analysis to predict genetic outcomes
- 4) Analyze phenotypic ratios to determine parental genotypes
- 5) Describe mechanisms of DNA damage and replication
- 6) Compare current techniques and technological advances in genetic research

GRADING & EVALUATION

If you have a question about your grade on any assignment, please submit a written description of the issue to your TA and make a case for why you believe the grade should be altered with reference to the assignment guidelines and grading rubric. Requesting a reassessment of your work will never result in a lower grade on the assignment in question.

The breakdown of your final grade is as follows:

| Assignment | Short Description | Points (/100) | Due Date | Learning Outcome Assessed |
|---------------------|--|---------------|-------------------|---------------------------|
| EXTRA CREDIT | Complete the introductory survey and midterm evaluation | 2 | May 19, Jun 30 | |
| Weekly Question Set | Complete the question set for each lecture (10 sets x 0.5 pts, full points for completion) | 5 | Weekly Wednesdays | 1,2,3,4,5,6 |
| Labster Modules | Simulations to be completed weekly (6 simulations x 1 pts, lowest dropped) | 5 | Multiple Fridays | 2,3,4,5,6 |
| Midterm Exam | Two hour exam consisting of multi-format questions (in class) | 25 | Jun 16 | 1,2,3,4,5,6 |
| Formal Lab Report | Report on analysis of hypothetical data, completed in groups of two | 15 | Jul 9 | 2,3,4 |
| Labster Assignment | Multi-format questions based on labster simulations, completed in groups of three | 15 | Aug 6 | 2,3,4,5,6 |
| Final Exam | Three hour exam consisting of multi-format questions (during final exam period) | 35 | TBD | 1,2,3,4,5,6 |

Additional documents with guidelines and rubrics for the Formal Lab Report and the Labster Assignment will be posted to Quercus. All assignments will be submitted through Quercus.

LATE POLICY

Late submissions for all assignments are subject to a penalty of 10% per day unless an extension has been granted by the course instructor, with no late assignments allowed after **7 calendar days**. For example, if your lab report receives a grade of 85, and it was two days late, with a 10% late penalty per day, your final grade would be 65. Requests for extensions will only be considered on a case-by-case basis if you contact the course instructor by email at least ONE WEEK prior to the due date.

REQUIRED TEXTBOOK

Genetics: From Genes to Genomes. Hartwell 7th ed. McGraw Hill.


COURSE WEBSITE

You can find all course materials online via Quercus.

LECTURES: Lectures will be posted as pdf files by the night prior to the lecture to allow you to fill in details or refer to figures/tables/references.

Please see the information about Intellectual Property further down in this document.

WEEKLY QUESTION SET: After lecture each week you will be assigned a short set of problems to complete on Quercus. They will be due at the start of the lecture the following week. You will receive full points for that week simply for completing the questions.



LABORATORY PRACTICALS: Weekly labs will be led by the TAs where they will go over concepts covered in the labster simulation for the week and will be available to answer any questions you may have.

LABSTER MODULES: You will be responsible for completing six labster simulations throughout the semester. Each week a module is due, you will have time during the laboratory practical to complete it. You must achieve a grade of 70% or higher on the simulation to receive the full point for each module. Each module will be due on the Friday of the week it is assigned. If the module is NOT completed by the deadline, you will receive a zero for that module. Your lowest module mark will be dropped (if you miss one or achieve less than 70%).

Please see the tentative schedule below for assigned modules and due dates.

LABSTER ASSIGNMENT: After all labster modules have been completed, you will complete an assignment based on the collective labster simulations. You will complete this assignment in groups of three. More details will be provided in Week 10 of the course.

FORMAL LAB REPORT: You will be provided with hypothetical data to use to complete a formal lab report in groups of two. More details will be provided in Week 6 of the course.

EXTRA CREDIT: There will be two extra credit surveys available in Week 1 and Week 7 of the course. Each will be worth 1 pt of extra credit.

MIDTERM EXAM: The midterm will take place during class time (12-2pm EST) on June 16th. It will cover lectures 1-5.

FINAL EXAM: The final exam will be **cumulative** and will cover all lecture topics.

MISSED EXAMS

Students that are unable to attend the midterm for religious reasons, short-term illness, or several personal circumstance must notify the course instructor by email at least 3 working days before the midterm and submit documentation to Jennifer Campbell (jac.campbell [at] utoronto.ca), the Course Coordinator in Biological Sciences. Students who miss the midterm for a medical reason must present a completed UTSC medical certificate (available via the registrar's website) that confirms their illness, and medical attention, at the time of the exam. *Medical certificates will be verified.*

There will be a single make-up for the midterm for students with a documented excuse or accommodation, as validated by Jennifer Campbell. Alternative arrangements are *NOT* possible, except as arranged by AccessAbility. The date of the make-up test will be announced on Quercus and it is the *SOLE RESPONSIBILITY* of the affected student to ensure they are aware of this date. Students that miss the midterm with no acceptable, documented excuse will receive a "0" grade for that test. Students that miss the midterm and the make-up and have documented, confirmed excuses for both will have those marks re-distributed equally across the other five assessments in the course.

Students that **miss the Final Exam** must petition the Registrar to write a deferred exam.



STUDENT EXPECTATIONS

I expect all students to not only view lectures (either live or recorded), but to be engaged with the material through effective note taking and asking questions when they arise. This course involves weekly laboratory sessions for each topic so it is vitally important for you to establish and maintain a weekly schedule, as it would be very easy to fall behind. You should understand the material in the lectures and textbook, know the theory behind it, and ensure you can follow the examples outlined in the lectures and the textbook.

COMMUNICATION POLICY


There are several ways to get help in this course. The first and best is through the online office hours held by myself and the TAs. These office hours will be held using the 'Bb Collaborate' link on the Quercus navigation bar. I am also happy to arrange office hours by appointment if you cannot attend the weekly scheduled hours. Questions can also be posted to the online discussion board or emailed. Please use your university email address for email communications and avoid asking content questions via email. Finally, please treat all of our communication professionally. I treat all of my students with respect and expect to be granted the same courtesy. Please allow at least 48 hours for a response to your question. Major announcements will be posted to Quercus. It is your responsibility to be aware of any announcements made in class.

CLASS DISCUSSION ETIQUETTE

Please feel welcome to turn your video on during lecture, but it is not required. Feel free to discuss the course in the chat window, but please stay on topic and be respectful of your fellow students. This applies to both live discussions as well as discussion boards on Quercus. There will be two general discussion boards. One will be for student-to-student communication, where I will not comment. The other will be for comments and/or questions for me. I will monitor this discussion board regularly, but students are also welcome to respond to threads and answer questions. Please allow 24 hours for a response. I recommend that you regularly check the discussion board for new content to enhance your studying. Again, please respect your fellow students on these discussion boards and maintain a considerate dialogue. Please see the EDI statement below for a link to the Student Code of Conduct.

EQUITY, DIVERSITY, AND INCLUSION STATEMENT

"The Department of Biological Sciences acknowledges the barriers that people of colour and other marginalized groups face, particularly in science and academia. As a department, we are highly committed to creating a welcoming scientific community where everyone feels safe, comfortable participating, and which provides the necessary support to thrive. We acknowledge and are disheartened that Black, Indigenous and other marginalized communities are, and always have been, disproportionately impacted by systemic racism and face barriers within academia. In August 2020, our department formed an equity and inclusion task force that will meet regularly to discuss equity and inclusion and enact improvements to our departmental practices by actively engaging with the literature on best practices, and seeking ongoing input from all members of the department including students, post-doctoral fellows, staff and faculty. Among our main priorities will be a commitment to hire and support faculty and staff that are representative of our diverse student population, and to promote a departmental culture that will foster inclusive teaching and research excellence."



Part of the aim of this course is to generate productive discussions around topics of genetic applications. As such, I expect everyone to show respect for the different backgrounds, experiences, beliefs, and values expressed by any member of this class. There will be no tolerance for behaviour or speech that violates the Code of Student Conduct (found here: <https://www.utoronto.ca/edio/policies-procedures>). Find out more about UTSC's commitment to EDI here: <https://www.utoronto.ca/edio/>.

ACCOMMODATIONS STATEMENT

We welcome students with diverse learning styles and needs in this course. If you may require special accommodations in this class, you are encouraged to contact both the AccessAbility Services Office, and myself as soon as possible to ensure that we have time to implement any necessary accommodations. AccessAbility Services staff (located in room AA142) can be reached by phone (416-287-7560) or email ([ability \[at\] utoronto.ca](mailto:ability@utoronto.ca)) and are available by appointment to assess specific needs, provide referrals, and arrange appropriate accommodations.

HEALTH & WELLNESS

Everyone experiences challenges during their university career, and now more than ever it is important to seek help if you are struggling. If you or someone you know needs someone to talk to, here are some resources you can contact:

- Your instructors or program coordinators
- Your college registrar and office of residence of student life (ORSL)
- MySSP [24/7, talk in 146 languages & text in 35 languages]: available for Apple and Android
- Good 2 Talk Student Helpline [24/7]: 1-866-925-5454
- Gerstein Centre [24/7]: 416-929-5200

ENGLISH LANGUAGE SUPPORT

The academic writing style is unfamiliar to most students at the beginning of their University programs. To help you master scientific texts, consider taking the free and confidential 20-minute Academic English Health Check (AEHC) (<https://www.utoronto.ca/eld/academic-english-health-check-aehc>) and using the free resources available at the English Language Development Centre to support your learning (<https://www.utoronto.ca/eld/english-language-development-support-consultations>).

ACADEMIC INTEGRITY

It is critical for all members of the scientific community, including students, to respect the value of each other's intellectual work and trust the contributions that we all make to the greater body of knowledge. As such, we must all work to protect the integrity of our community, our degrees, and our work by respecting the rules outlined in the University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>). All students in this course must abide by this code, which outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Academic dishonesty (which includes cheating, plagiarism, and the use of unauthorized assistance) is a serious offense that can lead to suspension or expulsion. Please familiarize yourself with the offenses listed under Section B of the code. If you have any questions about what constitutes a violation of the code, please get in touch with me so that we can discuss it further.

TURNITIN

Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

INTELLECTUAL PROPERTY

Part of academic integrity is respecting the intellectual property of content creators/owners. You should be aware that your courses contain the intellectual property of the instructor, the TAs and possibly the University of Toronto. Sharing any course materials (e.g. lecture content, such as audio/visual recordings, handouts, or presentations; assignment materials, such as problem sets/solutions and exams; and other copyrighted material, such as primary literature pdfs) without the express permission of the creator/owner of those materials is a violation of intellectual property rights.

DISCLAIMER

I reserve the right to modify this syllabus and its contents throughout the semester to better achieve course goals and/or to enhance the quality of the course in response to unexpected circumstances or student feedback. I will always endeavor to give students advance notification of any changes. These notifications will be made in class and on Quercus, with the most up-to-date version posted to Quercus.

TENTATIVE SCHEDULE

| Week | Date | Lecture Topic | Reading | Lab Topic | Due |
|--------------|--------|---|------------|--------------------|-----------------------|
| 1 | May 12 | Introduction, Modern Genetics, Mendel's Laws | Ch 1 & 2 | NO LABS | |
| 2 | May 19 | Extension of Mendel's Laws | Ch 2 | Labster | Mendelian Inheritance |
| 3 | May 26 | Extension of Mendel's Laws, Chromosomes, Mitosis, Meiosis | Ch 2 & 3 | Labster | Medical Genetics |
| 4 | Jun 2 | X-linkage, Exceptions to Mendel's Laws | Ch 3 & 4 | Labster | Monogenic Disorders |
| 5 | Jun 9 | Recombination, Mapping Genes, Chi-Square Test | Ch 4 | Review | |
| 6 | Jun 16 | Midterm | | Work on Lab Report | |
| Reading Week | | | | | |
| 7 | Jun 30 | Guest Lecture – Special Topic | | NO LABS | |
| 8 | Jul 7 | Chromosome Mutations | Ch 9 | Work on Lab Report | Lab Report |
| 9 | Jul 14 | Chromosome Mutations, DNA Damage & Repair | Ch 8 & 9 | Labster | Cytogenetics |
| 10 | Jul 21 | Molecular Biology and Recombinant DNA Technology | Ch 14 | Labster | Gene Regulation |
| 11 | Jul 28 | DNA Technology & Human Genome Sequencing | Ch 20 | Labster | Gene Expression Unit |
| 12 | Aug 4 | Genetic Variants and Molecular Techniques | Ch 15 & 19 | Work on Assignment | Labster Assignment |
| 13 | Aug 11 | Review | | Review | |