1 Course Details

1.1 Calendar Description

Fundamental aspects of plant and animal genetics are covered in this course including the chromosomal basis of inheritance, natural and artificial selection, domestication, epigenetics and quantitative traits. Population dynamics and the effect of selection on allele frequencies will be introduced with examples from agricultural crop and animal species and companion animal species. Genomics will be introduced with an emphasis on the development and use of molecular genetic markers in marker assisted selection.

Pre-Requisites: (BIOL*1050 or BIOL*1070), BIOL*1090

1.2 Course Description

Fundamental aspects of plant and animal genetics are covered in this course to provide a solid foundation for future courses in plant or animal genetics. This course reviews and covers the chromosomal basis of inheritance, natural and artificial selection, domestication, epigenetics, qualitative and quantitative traits. This course introduces population dynamics and the effect of selection on qualitative and quantitative traits with examples from agricultural crop and animal species and companion animal species. Genomics will be introduced with an emphasis on the development and use of molecular genetic markers in marker-assisted selection. This course includes experiential learning activities to reinforce lecture material and provide real examples of the concepts introduced in class. By the end of the course, you will have been introduced to everything from Mendel to modern molecular genetics.

1.3 Timetable

Classes are Monday / Wednesday / Friday from 11:30am to 12:20pm online. Links to class events can be found in the "Content" section of the Courselink site. Seminars are online in Microsoft Teams. **Seminar attendance is required to receive a grade for each learning**
exercise. Seminars start the week of September 20.

Sections 0101 and 0102 Fri 2:30-4:20pm
Sections 0103 and 0104 Thurs 3:30-5:20pm
Sections 0105 and 0106 Thurs 11:30am-1:20pm
Sections 0107 and 0108 Tues 3:30-5:20pm
Section 0109 and 0110 Tues 1:30-3:20pm
Sections 0111 and 0112 Tues 11:30am-1:20pm

There are no seminars the week of the Fall Break (October 11th) or the last week of classes. Since the grade book and therefore grades are based on the section you are officially registered in, you cannot switch sections once seminars have begun and you cannot temporarily switch sections in a week.

COVID-19 Disclaimer: please be aware that the information on course delivery, accessibility and examinations presented in this outline were developed based on current University guidelines. However, due to the continuously evolving situation and resulting changes in public health recommendations, the format and delivery of this course may be revised with limited notice.

1.4 Final Exam

The final examination for MBG-2400 will be online Tuesday December 7, 2021 11:30am to 1:30 pm. Check CourseLink for the details and how to access the examination.

2 Instructional Support

This course is team taught by four instructors, two from Plant Agriculture - Drs. Wolyn and Lee - and two from Animal Biosciences - Drs. Robinson and Canovas - in that order. Drs. Wolyn and Lee with split the first half of the course teaching about 1/4 each while Drs. Robinson and Canovas will teach the second half of the course, also about 1/4 each. Dr. Andy Robinson is also the course coordinator from Animal Biosciences. Contact Andy via the course email, mbg2400@uoguelph.ca, for all concerns regarding scheduling, academic consideration and grade inquiries.

2.1 Instructional Support Team

Instructor: Andy Robinson
Email: mbg2400@uoguelph.ca
Telephone: +1-519-824-4120 x53679
Office: ANNU 122
Office Hours: See CourseLink or by appointment

Andy is the course coordinator so any emails about academic consideration, scheduling,
grades etc should be sent to Andy using the course email mbg2400@uoguelph.ca

Instructor: Elizabeth Lee  
Email: mbg2400@uoguelph.ca  
Telephone: +1-519-824-4120 x53360  
Office: CRSC 223/225  
Office Hours: By appointment

Instructor: David Wolyn  
Email: mbg2400@uoguelph.ca  
Telephone: +1-519-824-4120 x53092  
Office: ECBA 4236  
Office Hours: By appointment

Instructor: Angela Canovas  
Email: mbg2400@uoguelph.ca  
Telephone: +1-519-824-4120 x56295  
Office: ANNU 125  
Office Hours: By appointment

2.2 Teaching Assistants

Teaching Assistant (GTA): Ryley Vanderhout  
Email: rvande02@uoguelph.ca

Teaching Assistant (GTA): Sierra Schaus  
Email: sschaus@uoguelph.ca

Teaching Assistant (GTA): Ashley Hornby  
Email: ahornby@uoguelph.ca

Teaching Assistant (GTA): Jocelyn Rathie  
Email: jrathie@uoguelph.ca

Teaching Assistant (GTA): Megan Campbell  
Email: mcampb26@uoguelph.ca

Teaching Assistant (GTA): Nicholas Werry  
Email: nwerry@uoguelph.ca

Teaching Assistant (GTA): Loudon Herold  
Email: lherold@uoguelph.ca

3 Learning Resources

3.1 Required Resources

None (Textbook)  
There is no required textbook for this course any longer. In past years we used:
“Genetic Analysis – An Integrated Approach” 2nd Custom Edition by Saunders and Bowman


You may be able to find copies of this book on the used market if you would really like to have a textbook that pertains to the course. Please note that different versions of the textbook are available in hardcover or softcover and including or excluding the online learning material provided by the publisher so be careful if you are looking on the used market.

3.2 Other Resources

Extensive use is made of Courselink. Seminar guides, instructional videos and other learning resources will be posted on Courselink. Check Courselink for the individual schedule and deadlines for the learning activities for your section since each section meets at different times and therefore may have different schedules and deadlines.

Course Technologies and Technical Support (Software)

System and Software Requirements

This course will use these technologies quite extensively:

- CourseLink
- online meetings in Zoom and MS Teams
- Microsoft Office suite, most specifically MS Excel
- Respondus Lockdown browser and video camera

To help ensure you have the best learning experience possible, please review the list of system and software requirements, and make sure you have a Zoom account and a Teams account.

https://opened.uoguelph.ca/student-resources/system-and-software-requirements

CourseLink System Requirements

You are responsible for ensuring that your computer system meets the necessary system requirements. Use the browser check tool to ensure your browser settings are compatible and up to date. (Results will be displayed in a new browser window).

http://spaces.uoguelph.ca/ed/system-requirements/ https://courselink.uoguelph.ca/d2l/systemCheck
Course Technologies

Please make sure you have a Zoom account before Class 1!

CourseLink

This course is being offered using CourseLink (powered by D2L’s Brightspace), the University of Guelph's online learning management system (LMS). By using this service, you agree to comply with the University of Guelph’s Access and Privacy Guidelines. Please visit the D2L website to review the Brightspace privacy statement and Brightspace Learning Environment web accessibility standards.


Technical Support

If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support.

Email: courselink@uoguelph.ca

Tel: 519-824-4120 ext. 56939 Toll-Free (CAN/USA): 1-866-275-1478

Support Hours (Eastern Time):

Monday thru Friday: 8:30 am–8:30 pm

Saturday: 10:00 am–4:00 pm

Sunday: 12:00 pm–6:00 pm

Zoom and Teams

This course will use Zoom for lectures and will use Teams for office hours and perhaps for labs. Check your system requirements to ensure you will be able to participate.

https://opened.uoguelph.ca/student-resources/system-and-software-requirements

4 Learning Outcomes
4.1 Course Learning Outcomes

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

1. Demonstrate an ability to model the transmission of qualitative and quantitative variation in plant and animal phenotypes.
2. Demonstrate an understanding of methods of genetic analysis for plants and animals.
3. Demonstrate the ability to synthesize the current state of knowledge regarding the mechanisms of genetic variation in plants and animals.
4. Demonstrate an ability to model the transmission of qualitative and quantitative variation in plant and animal phenotypes.

5 Teaching and Learning Activities

Lectures:

As noted above, all classes will be delivered remotely due to class size. Each instructor may have their own approach to teaching remotely just as they do when teaching in person. Class content information will be posted on CourseLink throughout the semester. The proposed topics covered throughout the semester are presented below. Note that this list is a proposed list of topics provided as a guide and actual lecture content may vary due to class pace through the material, instructor preference, coordinating with seminar scheduling and unforseen circumstances relating to the ongoing Covid-19 pandemic.

Seminars:

Seminars are two hours each week per section and are scheduled to be delivered via Microsoft Teams. Note that we use the term "Lab" interchangeably with "Seminar" in this course but they are officially known as Seminars. There are nine learning activities throughout the semester, the first for one week and labs 2-5 each one spanning two weeks. The first learning activity is an Excel tutorial to brush up on Excel skills. For learning activities 2-5, the first week is devoted to an activity that will generate data or information required for the second week where the data will be analyzed. Details of the activities, requirements and deadlines for each assignment are posted on CourseLink. As noted previously, students must connect on Teams to the section for which they are scheduled. If a student is unable to attend a seminar, they must contact the course coordinator (mbg2400@uoguelph.ca) and submit the academic consideration request form that can be found on Courselink to request academic consideration. In the event of changing pandemic restrictions, the seminar activities may need to be changed with very short notice.

5.1 Lecture

Week 1 - September 13 - Wolyn

Topics: Plant and animal life cycles; Single gene inheritance
Week 2 - September 20 - Wolyn

Topics: 
Inheritance of multiple genes and their interactions; Recombination and linkage

Week 3 - September 27 - Wolyn

Topics: 
Recombination and linkage; Intro to population genetics, maternal inheritance, and polyploidy

Week 4 - October 4 - Lee

Topics: 
Extensions to Mendelism-Continued, Recombination & Linkage

Week 5 - October 11 - Lee

Topics: 
FALL BREAK, Genome Structure

Week 6 - October 18 - Lee

Topics: 
Reverse and Forward Genetics - October 22 is the end of the material for the midterm exam

Week 7 - October 25 - Robinson

Topics: 
Population Genetics, Hardy-Weinberg Equilibrium, Migration, MIDTERM EXAM SEPTEMBER 30

Week 8 - November 1 - Robinson

Topics: 
Single Locus Selection, Quantitative Traits

Week 9 - November 8 - Robinson

Topics: 
Quantitative Trait Selection

Week 10 - November 15 - Canovas

Topics: 
Quantitative Trait Selection, Genetic Diversity

Week 11 - November 22 - Canovas
Topics: Genetic Diversity, Predicting Genotypes

Week 12 - November 29 - Canovas

Topics: Predicting genotypes, Wrap-up and Review (Robinson and Canovas)

5.2 Lab

September 13

Topics: NO LAB THIS WEEK

September 20

Topics: Lab 1 Excel Skills

September 27

Topics: Lab 2.1 Data Collection

October 4

Topics: Lab 2.2 Data Analysis

October 11

Topics: SHORT WEEK - NO LABS SCHEDULED

October 18

Topics: Lab 3.1 Data Collection

October 25

Topics: Lab 3.2 Data Analysis

November 1
6 Assessments

6.1 Marking Schemes & Distributions

For the midterm exam, we may have an alternate midterm date in the week following the midterm for students who have approved academic consideration requests with appropriate documentation for missing the midterm. If a student is unable to write the midterm exam at the scheduled time, they may ask for academic consideration by submitting the academic consideration request form found on the Courselink site and their documentation to the course coordinator (mbg2400@uoguelph.ca). If a student is granted academic consideration for the midterm exam, they should be prepared to write an alternate midterm exam between October 31 and November 3. Should a student be unable to write either the scheduled midterm or an alternate, then there are two options to resolve the midterm grade:

1. receive a grade of zero for the midterm or
2. write a special version of the final exam covering the entire course with a value of 70% of the final grade equally distributed between the material for the midterm (35%) and the material for the final exam (35%).

<table>
<thead>
<tr>
<th>Name</th>
<th>Scheme A (%)</th>
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<tr>
<td>Seminars</td>
<td>30</td>
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6.2 Assessment Details

Seminars (30%)

Date: See Section 5.2 above for details of activities
Learning Outcome: 1, 2, 3, 4
Seminars start the week of September 20 and meet weekly after that except for the short weeks at the Fall Study Break and the last week of the semester. Note that sections are paired up so that 2 different sections are meeting with 2 different TAs at the same time. Each student needs to know which section they are in and attend the correct section. You will receive an invitation on MS Teams from your TA for your section. TAs are recording attendance to lab sections and lab grades are linked to specific sections so students must attend their scheduled section to receive a grade for the learning activity that week. If a student wants to change lab sections, they must do so OFFICIALLY via WebAdvisor / the registrar's office BEFORE SEPTEMBER 20. Since the CourseLink grade book is linked to a specific section, once the first quiz opens Sept 20, students CANNOT CHANGE LAB SECTIONS, not even temporarily.

Lab 1 Quiz is worth 6%, each Lab x.1 Quiz is worth 2% and each Lab x.2 Quiz is worth 4% where x = (2,3,4,5)

Midterm Exam (35%)

Date: Saturday October 30, 2021 2:30pm to 4:30pm, Online
Learning Outcome: 1, 2, 3
The online midterm exam will cover all material presented by Drs. Lee and Wolyn and will use the Respondus lockdown browser + Webcam. Due to the very fluid nature of the fall semester schedule with the ongoing Covid-19 pandemic, in the event of an unexpected conflict or a semester schedule change by the University, it is possible that the midterm may need to be rescheduled. The instructors reserve the option to reschedule the midterm with 2-weeks prior notice.

Final Exam (35%)

Date: Tuesday December 7, 2021 11:30am to 1:30 pm, TBD
Learning Outcome: 1, 2, 3, 4
The online final exam will cover all material presented by Drs. Robinson and Canovas and will use the Respondus lockdown browser + Webcam.

7 Course Statements
7.1 Grading Policies:

There is a “no late” policy in this course. All lab deadlines are posted in CourseLink and quizzes are submitted through CourseLink. The Data Collection Quizzes and the Data Analysis Quizzes have generous deadlines to give you time to complete your analysis after getting guidance from your TA. **Any quizzes not submitted by the deadline will receive a grade of zero.** If you are unable to complete your quiz and would like to seek academic consideration, contact the course coordinator, preferably before your quiz component is due (Dr. Andy Robinson, mbg2400@uoguelph.ca).

Please note that we have had some challenges in the past with students switching sections and/or relying on classmates to collect the data / information for them. This is not acceptable in this course. **You cannot change sections after September 19.** The Courselink grade book is managed by section and the lab activities do not support randomly changing sections. **Seminar attendance will be recorded by your TA and you will not be able to switch sections temporarily.** If you did not attend your seminar section, any information you submit for that learning activity will receive a grade of zero. Why are we being so strict? The lab sections are balanced for the number of students so each student has access to the learning materials as well as the same reasonable expectation of getting assistance with the learning activities. If students randomly change sections, that balance is thrown off and affects all students as well as potentially affecting your ability to complete the lab activities within the time allotted and therefore potentially affecting your grade. So please keep it simple and just attend your scheduled section.

7.2 Course Policy on Group Work:

Students are encouraged to work in groups on the lab learning activities. However, even if students work together, each student must submit an individual lab assignment via the appropriate quiz that will be individually graded.

7.3 Course Policy on E-Mail:

The instruction team for this course is involved with other courses also, just as you are. Email is used as an important source of updates about this course. All official email from the instruction team will be sent to your University email account (@uoguelph.ca) - the University's privacy policy prohibits instructors from responding to non-UofG emails with any course information. It is expected that you are checking your official email account on a frequent basis. If you email any of the course instruction team, please use mbg2400@uoguelph.ca and keep in mind that with over 300 students in this course the instructor team receives a lot of email in a day. In order to facilitate a response to your email, please consider the following guidelines:

- address your email to mbg2400@uoguelph.ca where it will be directed appropriately by the course coordinator.

- if the answer to your email query can be found in the course outline or other material posted on the MBG-2400 CourseLink site, you might not receive a reply so please check those resources first
7.4 Course Policy on Technology:

Technology is vital to success in this course. It is your responsibility to make sure you have access to a good Internet connection and a suitable computer or electronic device such as a tablet or smartphone along with a web camera, microphone and speakers/earphones. Your device needs to be capable of browsing and reviewing recorded or live video, audio and printed content from CourseLink and across the internet. The University of Guelph’s online Learning Management System (aka CourseLink) is integral to the delivery of this course. It is also your responsibility to ensure that you can access the course materials and complete online course requirements, such as quizzes on CourseLink, within the time allotted. If CourseLink is not accessible for a significant period of time (not including scheduled maintenance) deemed by the instructor to have had an impact on students’ abilities to complete quizzes, deadlines will be extended.

In addition to accessing the CourseLink website via a suitable web browser, due to the ongoing Covid-19 restrictions additional software and applications will be used in the delivery of this course. These will include but not be limited to Zoom, Webex, MS Teams, MSOffice365 (Word, PowerPoint, Excel), Slido, Respondus lockdown browser, email, web-based apps and media players. The instructors will provide recommendations for software applications that are suitable for the purposes of the course but you will be ultimately responsible for finding, installing and maintaining any applications you use for this course.

In online classes, you need to use technology to connect to course events as well as take notes and interact with the course material. This should be done in a way that respects your fellow students by not creating undue distractions (see below under Online Behaviour). Also keep in mind that if your technology uses the University’s network, the University’s acceptable use policy also comes into play.

7.5 Recording of Online Course Activities

Due to the ongoing Covid-19 pandemic, some of the learning activities in this course have been shifted from face-to-face instruction to remote online instruction. As a result of accessibility needs, learning activities may be recorded by the instructor or TAs and posted to CourseLink, Zoom, YouTube or another appropriate platform for grading and dissemination. As a result, individual students may be recorded during these sessions.

By enrolling in this course, it is assumed that students agree to the possibility of being recorded during classes or other “live” course activities.

If you prefer not to be distinguishable during a recording, you may:
1. turn off your camera
2. mute your microphone (you should always mute your microphone when not participating anyway)
3. edit your identification in the online session or application (e.g. use your initials instead)
4. use the chat function to pose questions (again with identifying information adjusted).

Students who express to the instructors or TAs that they, or a reference to their name or person, do not wish to be recorded may discuss possible alternatives or accommodations with the instructors or TAs.

7.6 Course Policy regarding use of electronic devices and recording of lectures:
In keeping with University policy, electronic recording of classes is expressly forbidden without consent of the individual instructor for that class. When recordings are permitted, they are solely for the use of the authorized student and may not be reproduced or transmitted to others, without the express written consent of the instructor.

If the instructor provides a recording of the class or learning activity, these recordings are also solely for the use of the authorized student and may not be reproduced or transmitted to others, without the express written consent of the instructor. Please note that, if provided, these recordings are an optional additional tool for assisting with your learning and there is no guarantee a recording will be available for every online activity.

7.7 Online Behaviour - "Netiquette"
In light of the ongoing Covid-19 pandemic and restrictions and the resulting online delivery of this course in Fall 2021, the University has provided the following wording about netiquette.

**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

• Sharing your user name and password
• Recording lectures without the permission of the instructor
As a specific note about online classes, when joining online classes, please ensure your microphone is muted when you first connect. Most of the issues around online class connection quality and background distractions come from open microphones. For your own bandwidth management, you may also want to mute your video to reduce the amount of information passing through your internet connection.

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, 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.
8.10 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).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

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

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