



MBG*2400 Fundamentals of Plant and Animal Genetics

Fall 2019
Section(s): C01

Department of Animal Biosciences
Credit Weight: 0.50
Version 4.00 - September 05, 2019

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 a hands-on lab 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

Lectures are Monday / Wednesday / Friday from 11:30am to 12:20pm in War Memorial Hall. Labs meet alternately in CRSC 121 A and B. See the list of lab sections and the cohort designation below for the details on the lab schedule.

1.4 Final Exam

December 11, 2019 from 11:30am-1:30pm, room TBA - see WebAdvisor for final details.

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. The course coordinator is Dr. Andy Robinson (andyr@uoguelph.ca) from Animal Biosciences. Contact Andy for all concerns regarding scheduling, academic consideration and grade inquiries.

2.1 Instructional Support Team

Instructor: Andy Robinson
Email: andyr@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

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

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

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

2.2 Teaching Assistants

Teaching Assistant: Adam Brown
Email: abrown44@uoguelph.ca

Teaching Assistant: Alexandra Ficht
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Teaching Assistant: Hannah Godfrey
Email: hgodfrey@uoguelph.ca

Teaching Assistant:	Riani Soares
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Teaching Assistant:	Madaleine Swierczynski
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Teaching Assistant:	Nicholas Werry
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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

(ISBN 978-1-323-47021-3)

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.

3.2 Other Resources

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. If you are interested in additional practice material, you have the option of the online learning material or there is also a Student Handbook and Solutions manual available. None of the additional material is required but if you feel it will help your learning, it is available.

Extensive use is made of Courselink. Check Courselink for the individual schedule and deadlines for the lab activities for your section since each lab section meets at different times and therefore will have different schedules and deadlines.

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.
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5 Teaching and Learning Activities

Lectures:

Lecture 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 lab scheduling and unforeseen circumstances.

Labs:

Labs are two hours each week per section. There are five lab activities throughout the semester, the first for one week and labs 2-5 each one spanning two weeks. The first lab activity is an Excel tutorial to brush up on your Excel skills to help you with labs 2-5. For Labs 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 lab assignment are posted on CourseLink because the scheduling is defined by the section in which you are registered. Note that the lab sections are broken up into two cohorts. Cohort # 1 begins the lab activities the week of September 10 and Cohort # 2 begins the lab activities the week of September 17. and the lab schedule unfolds as shown below. Please note that you must attend the lab section for which you are scheduled. The data collected in week 1 of each lab is specific to the lab section so if you're not there, you don't have the data you need to complete the lab and receive the grade.

5.1 Lecture

Week 1

Topics: Introduction, Plant and Animal Life Cycles

Week 2

Topics: Modes of Reproduction and Sex Chromosomes

Week 3

Topics: Transmission Genetics, Extensions to Mendelism

Week 4

Topics: Extensions to Mendelism-Continued, Recombination & Linkage

Week 5

Topics: Thanksgiving, Genome Structure

Week 6

Topics: Reverse and Forward Genetics

Week 7

Topics: Population Genetics, Hardy-Weinberg Equilibrium, Migration

Week 8

Topics: Single Locus Selection, Quantitative Traits

Week 9

Topics: Quantitative Trait Selection

Week 10

Topics: **Class cancelled Monday November 11 since War Memorial Hall is used for Remembrance Day Services**

Genetic Diversity, Predicting Genotypes

Week 11

Topics: Genetic Diversity, Predicting Genotypes

Week 12

Topics: Wrap-up and Review

5.2 Lab

Sept 9

Topics: **Cohort 1:** Excel Tutorial and Quiz

Cohort 2: No lab scheduled

September 16

Topics: **Cohort 1:** Lab 2 Data Collection

Cohort 2: Excel Tutorial and Quiz

September 23

Topics: **Cohort 1:** Lab 2 Data Analysis

Cohort 2: Lab 2 Data Collection

September 30

Topics: **Cohort 1:** Lab 3 Data Collection

Cohort 2: Lab 2 Data Analysis

October 7

Topics: **Cohort 1:** Lab 3 Data Analysis

Cohort 2: Lab 3 Data Collection

October 14

Topics: **Short week due to fall break. No labs scheduled**

October 21

Topics: **Cohort 1:** Lab 4 Data Collection

Cohort 2: Lab 3 Data Analysis

October 28

Topics: **Cohort 1:** Lab 4 Data Analysis

Cohort 2: Lab 4 Data Collection

November 4

Topics: **Cohort 1:** Lab 5 Data Collection

Cohort 2: Lab 4 Data Analysis

November 11

Topics: **Cohort 1:** Lab 5 Data Analysis

Cohort 2: Lab 5 Data Collection

November 18

Topics: **Cohort 1:** No lab scheduled

Cohort 2: Lab 5 Data Analysis

November 25

Topics: **Short week due to revised Thursday / Friday schedule - no lab scheduled**

6 Assessments

6.1 Marking Schemes & Distributions

For the midterm exam, we 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. Should a student be unable to write either the scheduled midterm or the 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%).

Name	Scheme A (%)
Labs	30
Midterm Exam	35
Final Exam	35
Total	100

6.2 Assessment Details

Labs (30%)

Date: See CourseLink for details of activities

Learning Outcome: 1, 2, 3, 4

Sections are split into cohorts and the lab activities depend upon which cohort you are in. The cohorts start one week apart and finish one week apart. Labs start the week of September 10 for Cohort 1 and September 17 for Cohort 2 and meet weekly after that except for the short weeks at the Fall Study Break and the last week of the semester. In WebAdvisor it shows two rooms for each lab. In practice, you will alternate between lab rooms from week to week. The first week of the lab exercise you will meet in Crop Science 121B and the second week you will meet in Crop Science 121A. **Since the CourseLink grade book can't follow you across sections, once you start Lab 1, you CANNOT CHANGE LAB SECTIONS, not even temporarily or you will get zero for your lab grade(s).**

COHORT 1 Schedule

Section 0101 Tuesday 11:30 am – 1:20pm

Section 0102 Thursday 11:30 am – 1:20pm

Section 0103 Tuesday 2:30 pm – 4:20 pm

Section 0104 Thursday 3:30 pm – 5:20 pm

Section 0105 Monday 12:30 pm – 2:20 pm

Section 0106 Friday 3:30 pm– 5:20 pm

COHORT 2 Schedule

Section 0107 Tuesday 11:30 am – 1:20 pm

Section 0108 Thursday 11:30 am – 1:20 pm

Section 0109 Tuesday 2:30 pm – 4:20 pm

Section 0110 Thursday 3:30 pm – 5:20 pm

Section 0111 Monday 12:30 pm – 2:20 pm

Section 0112 Friday 3:30 pm – 5:20 pm

Midterm Exam (35%)

Date: Saturday October 19, 2019 7:00pm to 9:00pm, ROZH 104

Learning Outcome: 1, 2, 3

The midterm exam will cover all material presented by Drs. Lee and Wolyn.

Final Exam (35%)

Date: Wednesday December 11, 2019, TBD

Learning Outcome: 1, 2, 3, 4

The final exam will cover all material presented by Drs. Robinson and Canovas

7 Course Statements

7.1 Grading Policies:

There is a “no late” policy in this course. All lab deadlines are posted in CourseLink and labs are submitted through CourseLink. The Data Collection Quizzes have deadlines connected to the schedule of your lab section (i.e. when you have finished that part of the lab and have the information) and the Data Analysis Quizzes have generous deadlines to give you time to complete your analysis after getting guidance from your TA. **Any labs not submitted by the deadline will receive a grade of zero.** Note that individual lab sections have different data since you are working with organisms that are not all identical and/or they have time to grow between labs. Therefore **you need to attend your scheduled lab section** to record the correct data on which your grade will be based. If you are unable to attend your lab section or

complete your lab and would like to seek academic consideration, contact the course coordinator, preferably before your lab component is due (Dr. Andy Robinson, andyr@uoguelph.ca).

Please note that we have had some challenges in the past with students switching lab sections or relying on classmates to collect the data / information for them. This is not acceptable in this course. The lab activities do not support randomly changing sections or getting different data from classmates. Lab attendance will be recorded via CourseLink and if you do not attend your regularly scheduled lab section, then you will receive **a grade of zero** for the lab. Why are we being so strict? The changes that occur with the organisms being studied result in changes in the data collected in the labs across the 2-week period for each lab. If students switch lab sections or get data from classmates, the teaching assistants cannot track student progress across sections in CourseLink and therefore students will receive a grade of zero for a lab exercise if they did not attend.

7.2 Course Policy on Group Work:

Students will be encouraged to work in groups in the lab and the lab assignment has space to enter the names of the student collaborators that made up the group who worked together on the lab exercise. However, each student must submit an individual assignment that will be individually graded.

7.3 Course Policy on Technology:

The vast majority students are using their own technology such as smartphones, laptops and tablets in class as well as for the University of Guelph's online Learning Management System, CourseLink. In this course it is your responsibility to ensure that you can access the course materials and complete online course requirements within the time allotted regardless of technological issues you may encounter. There are many places on and off campus where computers may be accessed if your own technology is non-functional.

If CourseLink is not accessible for a significant period of time (not including announced, scheduled maintenance times) deemed by the course coordinator to have had an impact on students' abilities to complete quizzes, deadlines will be extended.

In this class, you are welcome to use technology to 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 in the classroom and/or in the lab. Keep in mind that if your technology uses the University's network to access the Internet, the University's acceptable use policy also comes into play.

http://www.uoguelph.ca/cio/sites/uoguelph.ca.cio/files/CIO-ITSecurity-03.1.3-AUP-Approved_0.pdf

7.4 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) - university

policy prohibits us 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 the course instruction team, please keep in mind that with over 400 students in this course and lots of students in their other courses, the instructors receive a lot of email in a day. In order to facilitate a response to your email, please consider the following guidelines:

- address your email appropriately. For housekeeping questions about academic consideration, missing labs, grade queries email Dr. Andy Robinson, the course coordinator (andyr@uoguelph.ca). For course content queries, contact individual TAs or instructors.
- 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
- include the course code (MBG-2400) and your section number (01xx) in the subject along with a few relevant key words indicating what your message is about
- include your full name and student number in the email signature
- allow 24 to 48 hours for a response (if you send an email late at night, we may not even see it until the next day)

7.5 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 lecture (aka "podcast"), 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, podcasts are an optional additional tool for assisting with your learning and there is no guarantee a podcast will be available for every lecture.

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>

