



ANSC*6370 Quantitative Genetics and Animal Models

Fall 2023
Section(s): C01

Department of Animal Biosciences
Credit Weight: 0.50
Version 1.00 - August 31, 2023

1 Course Details

1.1 Calendar Description

The course covers quantitative genetics theory associated with animal models; linear models applied to genetic evaluation of animals; estimation of genetic parameters for animal models; and computing algorithms for large datasets.

1.2 Course Description

In this graduate course, students will learn to develop linear statistical models for evaluating the genetic merit of animals, learn to apply models and interpret results from mixed model methodology in order to make genetic change in populations.

1.3 Timetable

Timetable is subject to change. Please see WebAdvisor for the latest information.

Tuesday/Thursday 1:00pm - 2:20pm, Room ANNU 030.

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 exam will be a take-home final comprehensive assignment.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Flavio Schenkel , Professor
Email:	schenkel@uoguelph.ca
Telephone:	+1-519-824-4120 x58650
Office:	ANNU 121
Office Hours:	Office hours: Thursdays from 3:00-4:00 pm.

3 Learning Resources

3.1 Required Resources

Course notes by Dr. Lawrence Schaeffer (Animal Models and Variance Component Estimation) will be used during the semester, which will be available in the course's webpage. (Notes)

- Students are advised to take their own notes during lectures.
- Extra pertinent information, such as papers, chapters of books, etc. will be accordingly recommended.

3.2 Course Technology and Technical Support

System and Software Requirements

This course will use the following technology:

- *CourseLink (main classroom)*

To help ensure you have the best learning experience possible, please review the list of system and software requirements.

<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>

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.

<http://www.uoguelph.ca/web/privacy/> <https://www.d2l.com/legal/privacy/>
<https://www.d2l.com/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

3.2 Technical skills

As part of your learning experience, you are expected to use a variety of technologies for assignments, lectures, teamwork, and meetings. In order to be successful in this course you will need to have the following technical skills:

- *Manage files and folders on your computer (e.g., save, name, copy, backup, rename, delete, and check properties);*
- *Install software, security, and virus protection;*
- *Use office applications (e.g., Word, PowerPoint, Excel, or similar) to create documents;*
- *Be comfortable uploading and downloading saved files;*
- *Communicate using email (e.g., create, receive, reply, print, send, download, and open attachments);*
- *Navigate the CourseLink learning environment and use the essential tools, such as Dropbox, Quizzes, Discussions, and Grades*
- *Submit all assignments and final exam in PDF format*
- *Access, navigate, and search the Internet using a web browser (e.g., Firefox, Internet Explorer); and*
- *Perform online research using various search engines (e.g., Google) and library databases.*

- *Learn to login on to Linux servers and use basic Linux commands.*
- *Learn to use SAS proc IML commands.*

3.2 Dropbox Submissions

Assignments should be submitted electronically via the online **Dropbox** tool. When submitting your assignments using the **Dropbox** tool, do not leave the page until your assignment has successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully. The system will also email you a receipt. Save this email receipt as proof of submission.

Be sure to keep a back-up copy of all of your assignments in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommend you save your assignments to a cloud-based file storage (e.g., OneDrive), or send to your email account, so that should something happen to your computer, the assignment could still be submitted on time or re-submitted.

It is your responsibility to submit your assignments on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. Remember that **technical difficulty is not an excuse not to turn in your assignment on time.** Don't wait until the last minute as you may get behind in your work.

If, for some reason, you have a technical difficulty when submitting your assignment electronically, please contact your instructor or CourseLink Support.

<http://spaces.uoguelph.ca/ed/contact-us/>

3.2 Library Access

As a student, you have access to the University of Guelph's library collection, including both physical and electronic materials. For information on checking out or couriering physical library items, accessing electronic journals and returning items to the library, visit the library's website.

If you are studying off campus and would like to access the library's electronic resources, use the Off Campus Login and login using your Single Sign On credentials or using your last name

and library barcode.

<https://www.lib.uoguelph.ca/>

<https://www.lib.uoguelph.ca/campus-login>

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Understand basic concepts of quantitative genetics and basic matrix algebra notation and operations
2. Integrate quantitative genetics and linear model methodology to genetically evaluate livestock
3. Accurately and effectively communicate scientific analyses in written form
4. Perform and understand data analyses using linear models in livestock
5. Appreciate differences among alternate statistical models
6. Discuss the relative merits of linear models used for estimation of genetic values and genetic parameters
7. Have a proficient command terminology common in quantitative genetics and breeding values prediction
8. Integrate knowledge of quantitative genetics and linear models to estimate covariance components and genetic parameters

5 Teaching and Learning Activities

5.1 Lecture Content

- Introduction to the course
 - Quantitative genetics review
 - Matrix algebra review
 - Writing a linear model
 - Estimation theory and estimability
 - Prediction theory
 - Genetic relationships
 - Animal model
 - Repeated records animal model
 - Maternal genetic models
 - Random regression models
 - Multiple traits
 - Estimation of variance and covariance components
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6 Assessments

6.1 Marking Schemes & Distributions

- The 9 assignments during the semester and the final exam will be posted on-line in the CourseLink web-page's dropbox at 1 pm of the released date.
- Submission of the assignments and the final exam will be done on-line via CourseLink web-page's dropbox by 5:30 pm of the due date. All submitted files shall be in a PDF format.

6.2 Assessment Details

Assignment 1 (3.7%)**Date:** Thu, Sep 14 - Thu, Sep 21**Learning Outcome:** 1**Assignment 2 (3.7%)****Date:** Thu, Sep 21 - Tue, Oct 3**Learning Outcome:** 1**Assignment 3 (3.7%)****Date:** Thu, Oct 5 - Tue, Oct 17**Learning Outcome:** 1, 2, 3**Assignment 4 (3.7%)****Date:** Tue, Oct 17 - Tue, Oct 24**Learning Outcome:** 1, 2, 3, 4

Assignment 5 (3.7%)**Date:** Tue, Oct 24 - Thu, Nov 2**Learning Outcome:** 1, 2, 3, 4**Assignment 6 (3.7%)****Date:** Thu, Nov 2 - Thu, Nov 9**Learning Outcome:** 1, 2, 3, 4, 5**Assignment 7 (3.7%)****Date:** Thu, Nov 9 - Thu, Nov 16**Learning Outcome:** 1, 2, 3, 4, 5, 6**Assignment 8 (3.7%)****Date:** Thu, Nov 16 - Thu, Nov 23**Learning Outcome:** 1, 2, 3, 4, 5, 6**Assignment 9 (3.7%)****Date:** Thu, Nov 23 - Thu, Nov 30**Learning Outcome:** 1, 2, 3, 4, 5, 6, 7**Midterm (33.33%)****Date:** Thu, Oct 26, 1:00 PM - 2:20 PM**Learning Outcome:** 1, 2, 3, 4

In class, closed book exam.

Final Exam (33.33%)**Date:** Fri, Dec 1 - Fri, Dec 15**Learning Outcome:** 1, 2, 3, 4, 5, 6, 7, 8

Take-home comprehensive assignment.

6.3 Grading scheme

The final grade will be based on the 9 Assignments, the Midterm Exam and the Final Exam.

The 9 assignments during the semester will have a percentage weight of 33.3% (3.7% each) of the final grade and the midterm exam and the final exam will have a percentage weight of 33.3% each.

7 Course Statements

7.1 Grading Policies

All the Assignments (including the Final Exam) must be submitted by 5:30 pm of the due date. Late assignments will be penalized as follow:

- 1 day late – 25% penalty (i.e. discount) applied to the obtained grade
- 2 days late – 50% penalty applied to the obtained grade
- 3 days late – 75% penalty applied to the obtained grade
- >3 days late – 100% penalty applied to the obtained grade

7.2 Course Policy regarding use of electronic devices and recording of lectures

Electronic recording of classes is expressly forbidden without consent of the instructor. 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.

7.3 Netiquette Expectations

The course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply. Inappropriate behaviour will not be tolerated. Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students;
- Using offensive language;
- 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;
- 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; and
- Sharing your username and password.

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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

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 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).
