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, on-line live lectures via Zoom platform available in the course's CourseLink web-page.

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: Virtual office hours: Thursdays from 2:20-2:50 pm via Zoom platform.

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.

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

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 (7.78%)
Date: Thu, Sep 17 - Thu, Sep 24
Learning Outcome: 1

Assignment 2 (7.78%)
  Date: Thu, Sep 24 - Tue, Oct 6
  Learning Outcome: 1

Assignment 3 (7.78%)
  Date: Tue, Oct 6 - Thu, Oct 15
  Learning Outcome: 1, 2, 3

Assignment 4 (7.78%)
  Date: Thu, Oct 15 - Thu, Oct 22
  Learning Outcome: 1, 2, 3, 4

Assignment 5 (7.78%)
  Date: Thu, Oct 22 - Tue, Nov 3
  Learning Outcome: 1, 2, 3, 4

Assignment 6 (7.78%)
  Date: Tue, Nov 3 - Tue, Nov 10
  Learning Outcome: 1, 2, 3, 4, 5

Assignment 7 (7.78%)
  Date: Tue, Nov 10 - Tue, Nov 17
  Learning Outcome: 1, 2, 3, 4, 5, 6

Assignment 8 (7.78%)
  Date: Tue, Nov 17 - Tue, Nov 24
  Learning Outcome: 1, 2, 3, 4, 5, 6

Assignment 9 (7.78%)
  Date: Tue, Nov 24 - Tue, Dec 1
  Learning Outcome: 1, 2, 3, 4, 5, 6, 7

Final Exam (30%)
  Date: Tue, Dec 1 - Tue, Dec 15
  Learning Outcome: 1, 2, 3, 4, 5, 6, 7, 8
  Final exam will be a take home comprehensive assignment.

6.3 Grading scheme

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

The 9 assignments during the semester will have a percentage weight of 70% (7.78% each) of the final grade and the final exam will have a percentage weight of 30%.
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.

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