



ANSC*6210 Principles of Selection in Animal Breeding

Winter 2023

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 1.00 - March 08, 2023

1 Course Details

1.1 Calendar Description

Definition of selection goals, prediction of genetic progress and breeding values, and the comparison of selection programs.

1.2 Course Description

The course is designed to provide a framework for the optimal use of genetic and genomic resources in animal production and the optimal approaches to changing those genetic resources in livestock. The course will cover the main animal breeding principles associated with selection for multiple traits in livestock.

1.3 Timetable

Lectures Tuesday and Thursday, 10:00 -11:20, ANNU Room 101. and/or by Zoom depending of COVID-19 situation and considering UofG guidelines.

1.4 Final Exam

No final exam in this course.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Angela Canovas
Email: acanovas@uoguelph.ca
Telephone: +1-519-824-4120 x56295
Office: ANNU 125
Office Hours: Wednesday 12:30pm-14:30pm (ANNU Room 101 and/or on Zoom)

But also by appointment / email me always if you need it.

2.2 Course Technology and Technical Support

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

Teams (via Office 365)

Office 365 Teams is a collaboration service that provides shared conversation spaces to help teams coordinate and communicate information. This course will use Teams for one on one meetings with your Instructor. It is recommended that you use the desktop version of Teams. As a student you are responsible for learning how to use Teams and it's features.

For Teams Support visit the CCS website for more information.

<https://www.uoguelph.ca/ccs/services/office365/teams>

Zoom

This course will use Zoom for lectures. Check your system requirements to ensure you will be able to participate.

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

3 Learning Resources

3.1 Additional Resources

Course Materials (Other)

- Lecture slides and other materials will be posted on CourseLink.
- Invited speakers from university, industry and farm/production level will give a talk during the course related to the importance of the selection in animal breeding and the genetic improvement from different points of views. Notes from speakers will also be linked on CourseLink.
- Dairy Cattle Breeding Simulation Program (DCBSP).

Medrano, J.F., A. Ahmadi and J. Casellas. 2010. Dairy Cattle Breeding Simulation Program (DCBSP v.4.9), a simulation program to teach animal breeding principles and practices. *Journal of Dairy Science* 93:2816-2826. PMID:20494191.

The DCBSP system is a dairy cattle breeding simulation program to teach undergraduate and graduate students animal breeding principles associated with selection for multiple traits in dairy cattle. The current version of the program (DCBSP v.4.9) is written in FORTRAN 90, and a web-based interface is developed for the students to interact with the program in the teaching environment. Both the backend simulation engine and the frontend web-based interface are driven by a module written in the Visual C++ programming language that loads the input files, runs the simulation, and uploads the output files onto the proper directories for each student on the web site. This software simulates a population of dairy cattle herds and artificial insemination bulls through several generations by integrating students' decisions about mating, culling, and selection of new

heifers and bulls based on a multivariate animal mixed model evaluation and marker-assisted selection. The DCBSP simulation system is used locally, nationally, and internationally for teaching animal breeding principles and is hosted at the Department of Animal Science, University of California, Davis.

- Suggested (complimentary) text "Optimizing Animal Genetic Improvement (Wilton, Quiton and Quiton, 2013).

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>

Ares

How to access course reserve materials through the University of Guelph McLaughlin Library. Select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve.

For further instructions on accessing reserve resources, visit How to Get Course Reserve Materials.

If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:

Tel: 519-824-4120 ext. 53621

Email: libres2@uoguelph.ca

<https://www.lib.uoguelph.ca/find/course-reserves-ares/how-get-course-reserve-material>

4 Learning Outcomes

To provide learning opportunities in:

4.1 Course Learning Outcomes

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

1. Methods of optimizing genetic improvement strategies considering genomic and quantitative information.
 2. “OMICS” technologies and methodologies to accelerate the genetic improvement in livestock.
 3. Improving selection efficiency by combining functional and structural genomic data with the estimation of molecular breeding values in livestock species.
 4. Selection in animal breeding and the importance of the genetic improvement from different points of views: academic/research, industry and farmer/production level.
 5. Graduate-level writing and oral presentation skills.
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5 Teaching and Learning Activities

5.1 Lecture

Topics:**Course Topics**

1. The role of genetics as a component of production systems.
 2. Methods to optimize the use of genetic population (breed, line, composite) differences, individual animals (sires and dams), genetic and genomic evaluation in different livestock species.
 3. Methods to determine traits of importance in production, including consideration of trait interactions.
 4. Methods to determine economic weights and breeding objectives, and subsequent selection criteria.
 5. The use of genomics tools to accelerate the genetic improvement in livestock. Improving selection efficiency by combining functional and structural genomic data with the estimation of molecular breeding values in livestock species.

 6. Accelerating the translation and transformation of research knowledge in genetics and genomics to enhance innovation in Canada’s dairy and beef cattle and sheep industries. Applied researches and last discoveries to increase the gain in Canada’s dairy and beef cattle industries.
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6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Report Project based on Dairy Cattle Breeding Simulation Program	70
Paper Review and Oral Presentation	30
Total	100

6.2 Assessment Details

Report Project based on Dairy Cattle Breeding Simulation Program (70%)

Date: draft reports due wk. 5 and wk. 9, Final report due April 7, 2023

Learning Outcome: 1, 3, 4, 5

The simulation will be run during the whole semester. University of California, Davis will assign two herds per student and three different traits to work on. Every week we will rank the best herds based on the each student decision about mating, culling, and selection of new heifers for each economically important trait assigned. The winners' herds will be shown on the last week of the course (week 12).

The students will prepare a draft report (few slides) showing their progress in the simulation on week 5 and week 9 of the course. This progress report can be considered a rough draft of your final project report. The instructor will review this and then make recommendations that can be combined into the final report. Every short presentation on week 5, week 9 and week 12 (TBD) will be 10% of the grade (each one).

The final report project should provide the summary of the results and a discussion of the decisions made regarding mating, culling, and selection of new heifers and bulls based on a multivariate animal mixed model evaluation and marker-assisted selection using the Dairy Cattle Breeding Simulation Program (DCBSP). The final report should incorporate the feedback received on the progress reports. The final report project will be 40% of the grade.

The final report is due at the end of week 12 on April 7th. All reports can be submitted via email or via the Dropbox on CourseLink.

Paper Review and Oral Presentation (30%)

Date: Date to be determined

Learning Outcome: 1, 2, 3, 4, 5

The paper review is designed to provide an opportunity to discuss course topics as they relate to current research in animal breeding. Student will find a research paper to review, which must be approved by the instructor. Each student will present their review in a short (15 min) presentation during CGIL Friday workshop toward the end of the semester (date to be determined).

Grades will be based on students' own presentation, participation in discussing others' papers.

Titles and citations of two potential papers should be submitted to the Dropbox by the end

of week 7 (March 3rd, 2023).

* Note CGIL Friday workshop will be determined if it will be in-person and/or on-line depending of COVID-19 situation and following UofG guidelines.

7 Course Statements

7.1 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/>

7.2 Netiquette Expectations

Online Behaviour

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

7.3 Late Policy

If you choose to submit assignments to the **Dropbox** tool late, the full allocated mark will be reduced by 5% per day after the deadline for the submission of the assignment to a limit of six days at which time access to the **Dropbox** folder will be closed. Late Graded Homework Assignments will NOT be graded if they are submitted after the solutions have been posted to CourseLink.

Extensions will be considered for medical reasons or other extenuating circumstances. If you require an extension, discuss this with the instructor as soon as possible and well before the due date. Barring exceptional circumstances, extensions will not be granted once the due date has passed. These rules are not designed to be arbitrary, nor are they inflexible. They are designed to keep you organized, to ensure that all students have the same amount of time to work on assignments, and to help to return marked materials to you in the shortest possible time.

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

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