

GENETICS



FLORIDA INTERNATIONAL
DAIRY ACADEMY

DEPARTMENT OF ANIMAL SCIENCES

Class Periods: Online, three lectures per week and a one-on-one zoom interaction per week

Academic Term: Spring 2021

Instructor:

Fernanda M Rezende

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Office Hours: by appointment

Course Website and Communication

The course is offered using CANVAS on the IFAS Extension Online Learning platform. The website www.animal.ifas.ufl.edu/dairy/FIDA/ is used for the lectures and to post materials and announcements. All electronic communication between students and instructor needs to occur through the website provided.

Course Description

This is a 4-week course which consists of three 50-minute lectures and a single 1-hour one-on-one zoom interaction per week. The lectures can be viewed at the student's convenience during the week, but all material should be covered prior to weekly one-on-one zoom session.

The Genetics course is designed to cover different aspects involved in the genetic improvement of dairy cattle, providing both theoretical and practical understanding of the biological principles and genetic concepts direct bearing on dairy cattle breeding programs. Students will gain insights in how to bring the genetic progress from the breeding program to the farmer.

Although this course is open to everyone, it is particularly useful for who have worked or are looking for career opportunities in artificial insemination (AI) companies, private breeding companies, dairy production facilities, private dairy corporations, national dairy herd information associations (DHIA), dairy breed associations, consultancy companies, dairy extension offices and genetic testing companies, and are looking to increase their knowledge or want a refresher and some up-to-date information on dairy cattle genetics.

Course Objectives

At the end of this course, students will be acquainted with the scientific basis, skills and tools to make effective genetic-driven management, selection and mating decisions to accelerate the genetic gain and improve the profitability and sustainability of commercial dairy herds. This knowledge will be gained by 1) understanding how genetics contributed to transforming the dairy industry, 2) learning the basics of genetic selection, 3) understanding dairy cattle genetic improvement programs, 4) understanding selection for multiple traits, 5) learning from fundamentals to field of genomic selection, 6) understanding changes in sire genetic evaluations, 7) learning how to use genomics to make informed decisions and, 8) exploring recent advances and future opportunities in dairy breeding.

Course Schedule

Week 1:

- Genetics contribution to the success of the dairy industry
- DNA as carrier of genetic information
- Complex traits inheritance

Week 2:

- Genetic principles behind dairy cattle transformation
- Principles of genetic selection
- Basics of animal breeding

Week 3:

- Dairy cattle breeding program structure
- Dairy cattle genetic evaluations
- Understanding the output of genetic evaluations

Week 4:

- The importance of sire selection in dairy herds
- Basics of dairy sire selection
- Impacts of changes in genetic evaluation on sire ranking

Week 5:

- Dairy production is a complex system
- Strategies for multiple traits selection
- Dairy cattle inbreeding and crossbreeding

Week 6:

- Traditional versus genomic selection
- Genetic basics behind genomic selection
- Boosting genetic gain with genomic selection

Week 7:

- Breeding strategies using genomics
- Breeding for disease resistance
- New phenotypes, sustainability, profitability and productivity in dairy cattle

Week 8:

- The genetics beyond DNA variations
- Genomic testing: practical results
- Economic impacts of genomic selection in dairy cattle

Class Expectations, and Make-Up Policy

Lectures can be viewed at their convenience during the week, but all material should be covered prior to weekly one-on-one zoom session. Conflicts that prevent students from taking an exam as scheduled should be discussed with the instructor.

Grading Policy

Pass/Fail

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.