

ANSC 444

Applied Animal Genetics

Spring 2016 Credits: 3 hrs

Course Information

Instructors:

Dr. Sandra Rodriguez Zas

Office: Room 30 Animal Sciences Laboratory (ASL)

Email: rodrqzszs@illinois.edu

Lecture-labs: Tuesdays and Thursdays 9:30AM-10:50 AM ACES Lib, Info and Alumni Center LIAC Room 023

Office hours: After class or by email appointment

Course web address: <https://compass2g.illinois.edu>

Course name: ANSC 444

Web page login: University of Illinois at Urbana-Champaign NetID

Web page password: University of Illinois at Urbana-Champaign NetID password

Objectives

The aims of ANSC 444 are: 1) to introduce the principles of animal genetics and breeding and their application in the improvement of animal production, health or well-being, and 2) to demonstrate the use of genetic information and the breeders' toolbox to reduce the frequency of detrimental alleles or augment the frequency of favorable alleles in an animal population.

These objectives will be accomplished through lectures, computer lab sections, assignments and assessment materials.

Outcomes

By the end of the semester, the students will:

Understand with the principles of Mendelian inheritance, recombination, mutation, selection and non-random mating

Be cognizant of the different breeding approaches for simple and polygenic traits;

Comprehend the genetic model used to describe quantitative traits;

Analyze quantitative traits and genetic prediction using statistical approaches;

Understand and compute heritability, repeatability, and estimated breeding values;

Understand large-scale genetic evaluation;

Assess factors that influence the rate of genetic change;

Consider the benefits of different mating systems and mating strategies;

Comprehend the concept of hybrid vigor and its application to crossbreeding systems;

Be exposed to biotechnology applications to animal genetics and breeding;

Comprehend genomic selection.

In summary, by the end of the course, the students will be able to understand and apply animal genetics and breeding concepts, analyze and accurately interpret relevant information, and draw scientifically sound and meaningful conclusions.

Methodology

Real-life examples and problem sets will be discussed in class. Problem-based learning will be complemented with hands-on practice of concepts using simulation programs and genetics software packages.

Topics

Introduction to animal breeding concepts, breeding objectives

Animal breeding methods

Mendelian inheritance, dominance/recessiveness, sex-related inheritance

Introduction to Simulation Program

Gene and genotypic frequencies

Simple and polygenic inheritance

Simple trait selection, test mating, effectiveness of selection

Quantitative traits and genetic model

Quantitative traits statistics

Heritability and repeatability

Introduction to simulation program

Linear models
 Selection response
 Genetic prediction
 Large-scale genetic evaluation
 Introduction to quantitative genetics program
 Correlated selection response
 Multiple trait selection and selection index
 Mating for specific gene combinations, random and assortative mating
 Genetically based mating systems, inbreeding and relationship matrix
 Advanced quantitative genetics program
 Outbreeding & hybrid vigor
 Crossbreeding systems
 Biotechnology, reproductive technologies and animal breeding
 Molecular technologies
 Genomic selection

Required reading materials:

Understanding Animal Breeding 2nd Edition. Richard M. Bourdon. Prentice Hall (Pearson Press).
 Lecture notes. Materials are available in the ANSC 444 Compass 2g website.
 Highlights of the required book chapters and software will be presented during the lectures.

Attendance of lectures and laboratories

Class notes will be complemented with additional information provided by the instructor during the lecture/laboratory hours. All homework assignment and in-class examination information will be covered during the lectures. Attendance is strongly encouraged and students are responsible for all material covered in lecture.

Grading

Grading will be based on 4 homework assignments (each 15% of the total final score) and 2 in-class exams (each 20% of the total final score). Demonstration of work in the homework assignments and exams is required to receive full points. The material covered in the in-class examinations will be detailed prior to each examination.

Grading

<u>Evaluation type</u>	<u>Deadline or due day</u>	<u>Points</u>
Homework assignment 1	Tuesday February 04, 2016 at 9:30 AM	150 points
In-class presentation 1	Tuesdays February 09, 16 at 9:30 AM	50 points
Homework assignment 2	Tuesday February 25, 2016 at 9:30 AM	150 points
In-class midterm exam	Thursday March 15, 2016 at 9:30 AM	150 points
Homework assignment 3	Tuesday March 31, 2016 at 9:30 AM	150 points
Homework assignment 4	Tuesday April 21, 2016 at 9:30 AM	150 points
In-class presentation 2	Thursdays April 21, 28 at 9:30 AM	50 points
In-class final exam	Tuesday May 03, 2014 at 9:30 AM	150 points
Total:		1000 points

Letter grades will be assigned based upon the following scale:

A > 900, A- > 850, B+ > 800, B > 750, B- > 700, C+ > 650, C > 600, C- > 550, D+ > 500, D > 450, F < 450

Policy on Missed In-class Examinations

Make-up in-class examinations will be given only if arrangements are made with the instructor prior to missing the exam and with demonstrated health or personal extenuating circumstance. Make-up exams will be scheduled within one week after the original in-class exam. Grades not made up within one week will be assigned a zero.

Policy on Homework Assignments

Assignments must be submitted through the ANSC 444 Compass 2g website prior to the due day and time.

The answers to the homework assignment must be included in the homework assignment file downloaded from the course website. The homework assignment file must be in MS word format and the name must include the Netid of the student and the homework identification (e.g. rodrgzs_hwk1). Only one file will be graded per homework assignment.

Students are encouraged to submit the homework assignments at least 10 minutes prior to the deadline to avoid mishaps. Students are responsible of ensuring that their work is correctly and successfully submitted electronically and

should notify the instructor of any problems with the internet connection or website at least 10 minutes before the assignment deadline.

Email and printed homework assignment submissions will not be accepted or graded.

One late submission of a homework assignment will be graded without penalty provided the instructor has been notified at least 48 hours prior to the deadline and the submission is no later than 96 hours (4 days) after the original deadline. One additional late submission of a homework assignment will only be accepted and graded if arrangements are made with the instructor prior to missing the homework assignment and with demonstrated health or personal extenuating circumstance. Homework assignment not submitted within 4 days of the original deadline will receive zero point.

Aids During In-class Examinations

In-class examinations will be open book, open notes. Answers must be individual. Internet can only be used to connect to the ANSC 444 Compass 2G website. Use of email, texting or social media is not allowed. During in-class examinations, communications are restricted to questions to the course instructor. Calculators are allowed. No communication device can be used.

Policies on computer resources and copyrights

All students must adhere to the rules and policies indicated by the software, websites and computer laboratories used for course related purposes. The policy on course notes and related printed and internet materials (e.g. published articles, website information) copyrights follows The General Rules Concerning University Organization and Procedure (University of Illinois Board of Trustees, 1998) and can be found at <http://www.vpaa.uillinois.edu/policies/patents.htm> and any other rule mentioned in the materials.

Academic Integrity

The University of Illinois at Urbana-Champaign *Student Code* should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://studentcode.illinois.edu/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Students with Disabilities

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the as soon as possible. To insure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class should contact Disability Resources and Educational Services (DRES) and see the instructor as soon as possible. If you need accommodations for any sort of disability, please speak to me after class, or make an appointment to see me, or see me during my office hours. DRES provides students with academic accommodations, access, and support services. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to disability@uiuc.edu. <http://www.disability.illinois.edu/>.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to *Family Educational Rights and Privacy Act* (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA.

Emergency Response Recommendations

Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <http://police.illinois.edu/emergency/floorplans/>.

Run > Hide > Fight

Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we're faced with any kind of emergency – like fire, severe weather or if someone is trying to hurt you – we have three options: Run, hide or fight.



Run

Leaving the area quickly is the best option if it is safe to do so.

- ▶ Take time now to learn the different ways to leave your building.
- ▶ Leave personal items behind.
- ▶ Assist those who need help, but consider whether doing so puts yourself at risk.
- ▶ Alert authorities of the emergency when it is safe to do so.



Hide

When you can't or don't want to run, take shelter indoors.

- ▶ Take time now to learn different ways to seek shelter in your building.
- ▶ If severe weather is imminent, go to the nearest indoor storm refuge area. If someone is trying to hurt you and you can't evacuate, get to a place
- ▶ where you can't be seen, lock or barricade your area, silence your phone, don't make any noise and don't come out until you receive an Illini-Alert indicating it is safe to do so.



Fight

As a last resort, you may need to fight to increase your chances of survival.

- ▶ Think about what kind of common items are in your area which you can use to defend yourself.
- ▶ Team up with others to fight if the situation allows.
- ▶ Mentally prepare yourself – you may be in a fight for your life.

Other resources

- ▶ police.illinois.edu/safe for more information on how to prepare for emergencies, including how to run, hide or fight and building floor plans that can show you safe areas.
- ▶ emergency.illinois.edu to sign up for Illini-Alert text messages.
- ▶ | **Follow the University of Illinois Police Department** on Twitter and Facebook to get regular updates about campus safety.