INSTRUCTOR: Dr. John Michael Mehaffey  
Room 103  
Agriculture Building

OFFICE HOURS: MW 8 – 9 am, 1 – 3 pm; TR 8 – 9 am, 3 – 5 pm  
or by appointment,  
Office 468-4319  
Cell: 806-790-4330  
E-mail: mehaffeyjm@sfasu.edu

LECTURE: 9:30 – 10:45 TR, Room 121

TEXT: **Understanding Animal Breeding** Bourdon, 2nd Edition. **(REQUIRED)**

Grading System: Final grade will be based on the following point distribution.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tr>
<td>Major Quiz 1</td>
<td>1/6</td>
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<tr>
<td>Major Quiz 2</td>
<td>1/6</td>
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<tr>
<td>Major Quiz 3</td>
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<tr>
<td>Homework</td>
<td>1/4</td>
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<td>Final Exam</td>
<td>1/4</td>
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COURSE DESCRIPTION:

Inheritance of traits of economic importance, records of performance, selection methods and breeding systems for the genetic improvement of farm animals.

OBJECTIVES:

1. An understanding of population genetics as they apply to animal agriculture.  
2. Understanding how statistical principles apply to animal breeding.  
3. Work statistical problems in animal breeding, including regression, correlation analysis of variance and least squares means, and interpret the results of those problems.  
4. A comprehensive review of animal breeding literature as it applies to each of the farm animal species.
The final examination will be optional for students with no unauthorized absences that turn in all assignments on time (a reasonable amount of extra time will be allowed if the assignment is late due to an authorized absence). Students with two or less unauthorized absences will be eligible for a curve in the course.

The homework grade will be the average of approximately 13 assignments. Late homework assignments will not receive full credit if they are turned in after the assignments that were turned in on time have been returned to the other students, unless they were late due to an authorized absence.

Review sessions may be scheduled before each major exam if there is sufficient interest.

**Tentative exam schedule:**
- February 11th
- March 3rd
- April 14th
- Final - May 12th, 8:00-10:00 am

Graduate students will have additional responsibilities to be determined at a later date, as well as different homework and exam questions.

**Attendance Policy**
Excused absences should be approved in advance when possible.

**Academic Integrity (A-9.1)**
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54)**
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will
automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/

**Acceptable Classroom Behavior**: Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the iCare Program [http://www.sfasu.edu/judicial/earlyalert.asp](http://www.sfasu.edu/judicial/earlyalert.asp). This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

**Responsible Use of Technology**: It is expected that all students will only use cell phones, PDAs, laptop or tablet computers, MP3 players, and related devices outside of class time or when appropriate in class. Answering a cell phone, texting, listening to music or using a laptop/tablet for matters unrelated to the course may be grounds for dismissal from class or other penalties.

**COURSE OUTLINE**

**A. Introduction**

1. Genetic improvement vs. management improvement
2. Historical development of animal breeding
3. Some misconceptions about animal breeding

**B. Development of Livestock Breeding Program**

1. Purpose of breeding program
2. Steps involved in establishing a program
3. Sources of genetic improvement

**C. Genetics of Populations**

1. Review of Mendelian Inheritance
2. Gene action
3. Gene frequency and population genetics
   a. Calculation of percent carriers of dwarf allele
4. Forces that change gene frequency
   a. Ridding an undesirable allele from a population
   b. Grading up to purebred status
   c. Lethal genes

D. Measurement of Quantitative Variation

1. Simple statistics
   a. mean or average
   b. variance, standard deviation, and standard error
   c. correlation
   d. regression
2. Partitioning quantitative variation into its casual components
   a. Genetic causes of variability
      (1) additivity, dominance, epistasis
      (2) single and double locus example
   b. Environmental causes of variability
   c. Heritability

E. Genetic Progress through Selection

1. Response to selection
   a. Heritability
   b. Selection differential
2. Correlations between traits
3. Repeatability
4. Sources of information
5. Selection methods
6. Aids to selection

F. Systems of Mating

1. Inbreeding
2. Outbreeding
   a. Heterosis and systems of crossbreeding

G. Breeding Systems

1. Beef cattle
   a. Farm and ranch testing program
      (1) pre-weaning phase
      (2) post-weaning phase
   b. Reproduction
c. Central testing situations  
d. Beef carcass evaluation  
e. Crossbreeding  

2. Dairy cattle  
a. Testing programs  
   (l) DHIA  
   (2) sire selection  
b. Reproductive efficiency  
   (l) days open  
   (2) conception rate  
   (3) dystocia  
c. Inbreeding  
d. Selection methods  
   (l) pedigree  
   (2) individual record  
   (3) collateral relatives  
e. Factors affecting milk production  
   (l) record standardization  
   (2) management factors  
   (3) ways to increase milk production  

3. Swine  
a. Record standardization  
   (l) traits and indexes  
b. Testing programs  
   (l) central stations  
   (2) on the farm testing  
c. Carcass evaluation  
d. Reproduction  
e. Crossbreeding  

4. Sheep  
a. Traits of importance  
b. Selection methods used  
c. Effect of mating systems  
d. Testing programs available  
e. Record standardization  

5. Horses  
a. Traits of importance  
b. Selection methods used  
c. Effect of mating systems  

Topical examples utilized in this course will include those from the dairy cattle, beef cattle, sheep, goats, swine and horse industry.