Animal Growth and Development-Syllabus
ANSC4050/5050
Spring, 2014

Time and Place:
MWF, 10-10:50AM; AB104
Course Instructors:
Wei Guo, Ph.D.
Office: Animal Science/Molecular Biology Bldg, Room114
Phone: 307-766-3429
Email: wguo3@uwyo.edu
Office Hours:
MWF, 11-12PM or By Appointment
Teaching Assistant:
None
Prerequisites:
LIFE 2022 or undergraduate coursework in Biology, Reproduction, Physiology and Introduction to Animal Science
Course Description:
This course discusses animal growth and development from a single cell to an organism. Major subjects are focusing on factors influencing prenatal and postnatal growth and development, and tissues related to animal production, including muscle, adipose, connective tissue and bone. The purpose of this course is to enhance the ability of participants to improve growth rate of domestic animals and to increase the quality of carcasses and meat.
Course Goals:
Learn the principles and basic biological functions associated with animal growth and development applied to animal production systems. Understand factors affecting prenatal and postnatal growth and development in domestic animals and how alteration of these factors can change animal performance and/or body composition. Understand the organization and basic physiology of the organ systems in the body. Appreciate the association between animal growth and meat quality. Develop the capability to estimate and enhance growth and efficiency of animal products.
Text:
There is no assigned textbook. Reading assignments and suggestions will be made available and will come from research articles, online resources, and book chapters. Readings will be assigned. Below are some references that the student may wish to consult:
1). Principles of Animal Growth and Development, Gerrard and Grant; ISBN13: 978-0-7575-2986-3; Kendall Hunt Publishing, Dubuque, Iowa 52002. 2006.
2). Developmental Biology, Gilbert; ISBN: 0-87893-250-x; Sinauer Associate, Inc., Publishers Sunderland, Massachustts, USA. 8th edition 2006
3). Principles of Development, Wolpert and Tickle; ISBN: 978-0-19-955428-7; Oxford University Press. 4th 2011.

4). Hormonal Regulation of Farm Animal Growth, Hossner; ISBN-10: 0-85199-080-0; CABI Publishing, 875 Massachusetts Avenue, Cambridge, MA02139, USA. 2005.

Course Requirements and Expectations:

I expect students to attend classes. I hope students will become engaged in an interactive learning process. You should participate in classroom discussions and ask questions when a particular topic or point is unclear. These activities will facilitate the learning process. We will work as diligently as possible to insure all individuals are treated fairly, all opinions and personalities are respected, and everyone has an equal opportunity to succeed in this class.

Grades and Grading Policy:

Grades: Three 100-point exams 300 points
Final Exam 200 points
Written paper or report (for Graduate student only) 150 points
Note: For undergraduate student, total points is 500, and for Graduate student, the total point is 650.

Grading standards: 90-100%= A; 80-90%=B; 70-80%=C; 60-70%=D; and <60%=F.

If enrolled for ANSC 5050, students must write an 8-10 page review paper (100 points) and present the paper to others using PowerPoint (50 points). This work must be of high quality, appropriately referenced (minimum 10 refereed journal articles, 2 of which can be replaced with refereed book chapters). The topic must relate to the course material and must be approved by the instructor. Grading rubric will be reviewed at the start of the semester.

Course Outline/Topics:

I. Introduction to Growth and Development
   1. Introduction to Growth and Development
   2. Whole Animal Growth
   3. Methods to measure growth
   4. Improve domestic animal growth performance (Assigned topic for written paper)

II. Pre-natal growth and development
   1. Embryonic Development
   2. Myogenesis
   3. Regeneration
   4. Cell differentiation and Stem cells
   5. Nutritional regulation of prenatal growth (fetal programming)

Exam 1

III. Post-natal growth and development
   1. Muscle growth
   2. Muscle fiber types and plasticity
   3. Muscle fiber types and growth performance
   4. Adipogenesis
   5. Adipose tissue growth and development
   6. Adipose tissue metabolism
   7. Factors affecting adipose tissue growth, development and metabolism
   8. Growth and development of bone
   9. Growth and development of connective tissue

10. Cross-linking of connective tissue
11. Nutritional regulation of postnatal growth

Exam 2

IV. Hormone Regulation of Animal Growth
1. The Endocrine system
2. Growth hormone and Insulin-like growth factors
3. Calcium homeostasis and regulation of bone growth
4. Hormones, growth factors and skeletal muscle
5. Hormones, growth factors and adipose tissue
6. Steroids and animal growth
7. Catecholamines, beta-agonists and nutrient repartitioning
8. Leptin, body composition and appetite control

Exam 3

V. Genetic Influence and Animal Growth

VI. Biotechnology and Animal Growth

Final Exam