**ANIMAL SCIENCES**

**ANS 5446 Animal Nutrition 3 Credits**
**Grading Scheme:** Letter Grade
Carbohydrates, fats, proteins, minerals, and vitamins and their functions in the animal body. Offered fall term.
**Prerequisite:** ANS 3440, BCH 4024, or consent of instructor.

**ANS 5935 Reproductive Biology Seminar and Research Studies 1 Credit, Max 4 Credits**
**Grading Scheme:** S/U
Invited speakers on a wide range of topics. Student-faculty participation in research projects.
**Prerequisite:** ANS 3319C or equivalent.

**ANS 6040 Concepts in Applied Ethology 3 Credits**
**Grading Scheme:** Letter Grade
Introduces concepts and methods used to conduct research in the field of applied ethology. Course content includes an overview of mechanisms of animal behavior and approaches to measuring and modeling animal behavior. The focus is on developing skills necessary to conduct, analyze, and interpret research in applied ethology.
**Prerequisite:** CALS major

**ANS 6288 Experimental Techniques and Analytical Procedures in Meat Research 3 Credits**
**Grading Scheme:** Letter Grade
Experimental design, analytical procedures; techniques; carcass measurements and analyses as related to livestock production and meats studies. Offered spring term in even-numbered years.

**ANS 6319C Applied Ruminant Reproductive Management 4 Credits**
**Grading Scheme:** Letter Grade
In-depth review of applied bovine reproductive management; factors that affect the efficiency of reproduction (managerial, biological, and economical). Offered fall term.
**Prerequisite:** ANS 3319C

**ANS 6313 Current Concepts in Reproductive Biology 2 Credits**
**Grading Scheme:** Letter Grade
Lectures prepared by students and discussion of current review articles. Offered spring term in odd-numbered years.
**Prerequisite:** ANS 3319C or equivalent; consent of instructor.

**ANS 6379L Techniques Genetics 2 Credits**
**Grading Scheme:** Letter Grade
Techniques Genetics

**ANS 6387 Genetic Analysis of Complex Traits in Livestock 3 Credits**
**Grading Scheme:** Letter Grade
Comprehensive examination of principles of livestock inheritance, QTL mapping strategies and functional genomic approaches used for genomic selection and improvement programs in farm animals.

**ANS 6447 Ruminant Nutrition 4 Credits**
**Grading Scheme:** Letter Grade
The anatomy and physiology of the ruminant digestive system as well as the digestion and metabolism of dietary nutrients for the purposes of growth, pregnancy, and lactation. Ration formulations using computer software.
**Prerequisite:** ANS 5446: Animal Nutrition

**ANS 6449 Vitamins 3 Credits**
**Grading Scheme:** Letter Grade
Historical development, properties, assays, and physiological effects.
**Prerequisite:** organic chemistry.

**ANS 6452 Principles of Forage Quality Evaluation 3 Credits**
**Grading Scheme:** Letter Grade
Definition of forage quality in terms of animal performance, methodology used in forage evaluation, and proper interpretation of forage evaluation data. Offered spring term in even-numbered years.
**Prerequisite:** ANS 5446, AGR 4231C.

**ANS 6458 Advanced Methods in Nutrition Technology 3 Credits**
**Grading Scheme:** Letter Grade
Demonstrations and limited performance of procedures used in nutrition research. Offered fall term in even-numbered years.
**Prerequisite:** for graduate students but open to seniors by special permission.

**ANS 6636 Meat Technology 3 Credits**
**Grading Scheme:** Letter Grade
Chemistry, physics, histology, bacteriology, and engineering involved in the handling, processing, manufacturing, preservation, storage, distribution, and utilization of meat. Offered fall term in odd-numbered years.

**ANS 6637 Quantitative Microbial Risk Assessment of Pathogens in Food Systems 3 Credits**
**Grading Scheme:** Letter Grade
Modeling principles of microbial risk assessment in food chains. Model implementation in stochastic simulation software (R). Focus is on the bottom-up food chain approach and basic principles of the top-down approach.
**Prerequisite:** STA 6166 or similar statistics course & knowledge of the R programming environment.

**ANS 6702 Physiology of the Mammary Gland and Lactation 2 Credits**
**Grading Scheme:** Letter Grade
Offers insights into the endocrinology and physiology of the defining characteristics of mammals: the mammary gland and lactation, focusing on the anatomy and development of the mammary gland with an overview of the biochemical, cellular and molecular processes controlling lactation emphasizing on livestock species.
**Prerequisite:** ANS 6704 or permission of instructor

**ANS 6704 Mammalian Endocrinology 2 Credits**
**Grading Scheme:** Letter Grade
Physiologic systems of farm animals. Emphasizes the impact of endocrinology and cell biology on animal physiology, development and performance.
**Prerequisite:** BCH 4024 or BCH 3025, or equivalent.

**ANS 6705 Muscle Physiology 1 Credit**
**Grading Scheme:** Letter Grade
Overview of morphological, physiological, cellular, and molecular factors affecting muscle structure and function, with special emphasis on mammalian skeletal muscle.
**Prerequisite:** Undergraduate coursework in biology, biochemistry, and physiology.

**ANS 6707 Growth Physiology in Farm Animals 1 Credit**
**Grading Scheme:** Letter Grade
Biological regulation of muscle, cartilage and bone formation and function in farm animals with integration of physiological systems to livestock tissue growth.
**Prerequisite:** ANS 6704
ANS 6711 Current Topics in Equine Nutrition and Exercise Physiology
2 Credits
Grading Scheme: Letter Grade
Equine science with emphasis on current topics of interest. Offered fall term in odd-numbered years.

ANS 6714 Current Topics in Microbial Physiology in Animals
1 Credit
Grading Scheme: Letter Grade
Insights into microbial pathogenesis, microbial genetics, and molecular microbiology with particular reference to livestock species.

ANS 6715 Gastrointestinal and Feed Microbiology
3 Credits
Grading Scheme: Letter Grade
Microbiology of the rumen, hindgut, and feed; relation to livestock production and food safety.
Prerequisite: ANS 5446.

ANS 6716 Physiology in Farm Animals
1 Credit
Grading Scheme: Letter Grade
Physiology and function of the gastrointestinal system in monogastrics and ruminants.
Prerequisite: ANS 6704

ANS 6718 Nutritional Physiology of Domestic Animals
2 Credits
Grading Scheme: Letter Grade
Physiological, biochemical and molecular control of nutritional processes in monogastrics and ruminants.
Prerequisite: ANS 5446; introductory biochemistry course.

ANS 6723 Mineral Nutrition and Metabolism
3 Credits
Grading Scheme: Letter Grade
Physiological effect of macro- and micro-elements, and mineral interrelationships.

ANS 6750 Reproductive Physiology in Farm Animals
1 Credit
Grading Scheme: Letter Grade
Physiology and function of the reproductive system in farm animals.
Prerequisite: ANS 6704 and ANS 3319C or equivalent.

ANS 6751 Physiology of Reproduction
3 Credits
Grading Scheme: Letter Grade
Conceptual relationship of the hypothalamus, pituitary, and reproductive organs during the estrous cycle and pregnancy. Influence of exteroceptive factors and seasonal reproduction. Offered fall term in even-numbered years.
Prerequisite: BCH 5045 or equivalent.

ANS 6767 Advanced Endocrinology
4 Credits
Grading Scheme: Letter Grade
Overview of mammalian endocrine systems and molecular basis of hormone action; Current topics on endocrine control of growth, development, reproduction and nutrition.
Prerequisite: BCH4024 or BCH 5045; ANS 6704 ; or equivalent, or consent of instructor.

ANS 6775 Essentials of Livestock Immunology
1 Credit
Grading Scheme: Letter Grade
Basic immunological concepts and their relation to immunity for livestock and other species.

ANS 6905 Problems in Animal Science
1-4 Credits, Max 8 Credits
Grading Scheme: Letter Grade
Problems in Animal Science

ANS 6910 Supervised Research
1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research