# ANIMAL SCIENCES (AN SCI)

# AN SCI 1 – COOPERATIVE EDUCATION/CO-OP IN ANIMAL SCIENCES

1 credit.

Full-time off-campus work experience which combines classroom theory with practical knowledge of operations to provide a background upon which to base a professional career. Students receive credit only for the term in which they are actively enrolled and working. The same work experience may not count toward credit in another course.

Requisites: Consent of instructor Repeatable for Credit: No Last Taught: Spring 2019

# AN SCI/DY SCI 101 – INTRODUCTION TO ANIMAL SCIENCES 3 credits.

An overview of animal sciences covering anatomy, physiology, nutrition, reproduction, genetics, management, animal welfare, and behavior of domesticated animals. Food animals are emphasized to discuss their contributions to humans.

Requisites: None

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** No

Last Taught: Fall 2023

**Learning Outcomes:** 1. Articulate a uniform background of animal agriculture including animal growth, nutrition, reproduction, behavior, and breeds to facilitate learning in subsequent animal science courses Audience: Undergraduate

2. Accurately use terminology associated with animal agriculture including but not limited to animals, management practices, industry, and equipment Audience: Undergraduate

3. Identify major animal groups and breeds in the topic areas of companion, service, draft, food, and biomedical, their uses, and their care Audience: Undergraduate

4. Critically analyze past, current, and future controversial issues in animal agriculture and demonstrate capacity for ethical reasoning and action Audience: Undergraduate

5. Situate common contemporary animal production systems within the context of economic, social, and environmental sustainability Audience: Undergraduate

6. Characterize the impacts of animal agriculture at global, national, regional, and local levels Audience: Undergraduate

# AN SCI/DY SCI 102 – INTRODUCTION TO ANIMAL SCIENCES LABORATORY

1 credit.

Hands-on experience and demonstrations to develop practical skills with animals and to better understand the application of science to food production animals. It covers anatomy, physiology, nutrition, reproduction, genetics, management, animal welfare, and behavior of domesticated animals.

Requisites: DY SCI/AN SCI 101 or concurrent enrollment

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** No

Last Taught: Fall 2023

**Learning Outcomes:** 1. Recall and summarize fundamental concepts in animal growth, nutrition, reproduction, and behavior to facilitate learning in subsequent animal science courses Audience: Undergraduate

2. Accurately use terminology associated with animal agriculture including but not limited to animals, management practices, industry, and equipment Audience: Undergraduate

3. Demonstrate proper handling, restraint, care, and management of food animals Audience: Undergraduate

4. Identify anatomical parts of animal gastrointestinal and reproductive tracts, and explain the key functions of each part Audience: Undergraduate

5. Classify common feedstuff and nutritional analysis used in the livestock industry Audience: Undergraduate

6. Effectively engage in collaborative problem-solving and reflective practice Audience: Undergraduate

7. Interpret and discuss scientific literature Audience: Undergraduate

#### AN SCI 110 - ANIMAL HANDLING

1 credit.

Hands-on course that provides an understanding of livestock handling techniques, proper restraint, administering injections, and drawing blood samples. Learn about animal response to human presence and the effect of facility design on animal behavior.

Requisites: DY SCI/AN SCI 101 Repeatable for Credit: No

Lest Texable for Credit.

Last Taught: Spring 2017

**Learning Outcomes:** 1. Identify and show proper handling techniques used to restrain various livestock species Audience: Undergraduate

2. Evaluate and apply management procedures associated with industry standard health care management for livestock species Audience: Undergraduate

3. Recognize animal behavior response associated with outside pressures Audience: Undergraduate

## AN SCI 135 – GRAND CHALLENGES AND CAREER OPPORTUNITIES IN ANIMAL AND DAIRY SCIENCES

1 credit.

Covers the current key challenges and opportunities in the broad fields of animal agriculture, animal biology, animal health, and veterinary medicine, as well as internship and career opportunities and professional development activities that will maximize the value of an undergraduate career at UW-Madison and provide preparation for post-graduation endeavors.

#### Requisites: None

**Course Designation:** Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

### Repeatable for Credit: No

Last Taught: Fall 2023

**Learning Outcomes:** 1. Explain the Grand Challenges in our broad field, including Animal Health and Welfare, Food Safety, Land and Water Stewardship, Precision Livestock Farming, and Biomedical Advancements Audience: Undergraduate

2. Identify animal-related faculty and coursework, and create plans for courses and co-curricular opportunities that support your degree and future goals Audience: Undergraduate

3. Describe common independent and experiential learning opportunities, including undergraduate research, internships, study abroad, international study tours, intercollegiate competitions, and related activities Audience: Undergraduate

4. Identify internships, graduate and professional programs, and career opportunities in the public, private, and non-profit sectors related to animal agriculture, animal biology, animal health, veterinary medicine, and related fields Audience: Undergraduate

5. Develop professional skills that will help undergraduate students succeed in future endeavors, including preparing a resume, writing a cover letter, building a professional network, finding an internship, having a successful interview, and maximizing the job or internship experience Audience: Undergraduate

### AN SCI 140 – INTRODUCTION TO POULTRY: FROM BACKYARD CHICKENS TO COMMERCIAL PRODUCTION

1 credit.

Overview of poultry science and production. Topics include anatomy and physiology, nutrition, health, reproduction, genetics, egg and meat quality, and management. Includes information on poultry flocks of various sizes and purposes, from hobby flocks to commercial production.

#### Requisites: None

#### Repeatable for Credit: No

**Learning Outcomes:** 1. Describe common methods of poultry production and management. Audience: Undergraduate

2. Explain basic biological aspects of poultry, including health, nutrition, and reproduction. Audience: Undergraduate

3. Discuss the organization and structure of the poultry industry. Audience: Undergraduate

4. Identify measures of quality in poultry and egg products. Audience: Undergraduate

# AN SCI 200 – THE BIOLOGY AND APPRECIATION OF COMPANION ANIMALS

3 credits.

A systematic coverage of many of the animals (including birds) that humans keep as their social companions. The classification, nutritional requirements, environmental considerations, reproductive habits, health, legal aspects and economics of companion animals and their supportive organizations.

Requisites: None

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

### Repeatable for Credit: No

#### Last Taught: Spring 2024

**Learning Outcomes:** 1. Recognize a broad range of types of companion animals and identify some unique characteristics of each Audience: Undergraduate

2. Characterize the basic biology of most companion animals, including health, nutrition, reproduction, etc Audience: Undergraduate

3. Summarize the basic requirements of care and husbandry for a variety of companion animals Audience: Undergraduate

4. Identify differences in the biology and requirements of various types of companion animals. Audience: Undergraduate

5. Identify current topics regarding companion animals. Audience: Undergraduate

6. Characterize some ethical issues associated with animal ownership, care, and use. Audience: Undergraduate

#### AN SCI 240 – ANCIENT ANIMALS AND PEOPLES 3 credits.

Provides an introduction to human and animal relationships from prehistory to the present. Examines how animals have influenced social and economic structures of past societies, with a focus on the advent of domestication. Explores the cultural and economic changes that domestication has had on human societies, as well as the behavioral, genetic, and morphological changes that this process had on once wild animals. Emphasizes the methods used to retrace human-animal interactions, drawing on cross-cultural examples from anthropology, ethnozoology, archaeology, history, and genetics.

#### Requisites: None

**Course Designation:** Breadth - Either Biological Science or Social Science

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** No

Last Taught: Summer 2022

**Learning Outcomes:** 1. Develop skills in searching for and identifying literature using online and library resources, and gain familiarity with citing and referencing different source types. Audience: Undergraduate

2. Synthesize scholarly articles in the areas of animal science, archaeology, biology, and history. Audience: Undergraduate

3. Understand animal-human interactions from a global and historical perspective. Audience: Undergraduate

4. Evaluate the archaeological, historical, and genetic lines of evidence used to generate hypothesis on past animal-human interactions. Audience: Undergraduate

5. Develop a general chronology of the history of animal husbandry, livestock, and pet keeping around the world. Audience: Undergraduate

6. Analyze the process of artificial selection and the different pathways to domestication (commensal, prey, or directed). Audience: Undergraduate

7. Differentiate domesticated from tamed from feral and identify the behavioral and biological characteristics which makes certain animal favorable to domestication. Audience: Undergraduate

8. Apply course material to evaluate the role of past animal interactions on contemporary issues in conservation and food security. Audience: Undergraduate

#### AN SCI 245 – ANIMAL WELFARE

3 credits.

Explores animal welfare topics from the animal's perspective. Analyzes contemporary welfare issues and policies based on our scientific understanding of the experiences of animals. Emphasizes farmed animals, but also draws on examples from zoo, lab, and companion animals.

#### Requisites: None

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** No

#### Last Taught: Fall 2023

**Learning Outcomes:** 1. Discuss the scientific process as applied to animal welfare Audience: Undergraduate

2. Apply scientific concepts to analyze contemporary animal welfare issues Audience: Undergraduate

3. Identify situations that may compromise welfare in diverse species and contexts Audience: Undergraduate

4. Interpret scientific literature to evaluate animal welfare assurance programs Audience: Undergraduate

5. Articulate concepts of animal welfare in oral and written format Audience: Undergraduate

#### AN SCI 289 – HONORS INDEPENDENT STUDY

1-2 credits.

Honors research work under direct guidance of a faculty member in an area of Animal Sciences. Students are responsible for arranging the work and credits with the supervising instructor.

Requisites: Consent of instructor

**Course Designation:** Honors - Honors Only Courses (H)

**Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2007

**Learning Outcomes:** 1. Demonstrate content knowledge and skills as signified in an honors project or scholarly honors work. Audience: Undergraduate

2. Articulate their honors experience to peers. Audience: Undergraduate

3. Apply perspectives to composed work through engagement in academic experiences. Audience: Undergraduate

## AN SCI 299 - INDEPENDENT STUDY

1-3 credits.

Individual introductory to intermediate work under direct guidance of a faculty member in an area of Animal Sciences. Students are responsible for arranging the work and credits with the supervising instructor. **Requisites:** Consent of instructor

**Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024

**Learning Outcomes:** 1. Summarize intellectual growth associated with independent study work through mentor discussion. Audience: Undergraduate

2. Identify diversity of viewpoints through critical thinking. Audience: Undergraduate

3. Illustrate growth in reading, writing, and communication skills.. Audience: Undergraduate

# AN SCI/FOOD SCI 305 – INTRODUCTION TO MEAT SCIENCE AND TECHNOLOGY

4 credits.

Application of biological, technological, and economical principles to muscle and related tissue utilized for food.

**Requisites:** (ZOOLOGY/BIOLOGY/BOTANY 152 or ZOOLOGY/ BIOLOGY 101 and 102) and (CHEM 103, 109, or 115) or graduate/ professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** No

Last Taught: Fall 2023

# AN SCI/DY SCI/NUTR SCI 311 – COMPARATIVE ANIMAL NUTRITION

3 credits.

Nutrients and their assimilation, function, and interactions that affect metabolism in mammals. Differences among species will be used to emphasize unique digestive and physiological functions and how these differences affect metabolism of nutrients. Humans will be used in some comparisons. Follows physiological progression of nutrients, starting with an overview of the digestive tract followed by water and builds on specific roles of nutrients and substrates needed to provide basic processes required for maintenance, tissue accretion, and homeostatic regulation of nutrients.

**Requisites:** CHEM 341, 343, (BIOCHEM 301 or concurrent enrollment), or (BIOCHEM 501 or concurrent enrollment)

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** No

### Last Taught: Spring 2024

**Learning Outcomes:** 1. Recall and summarize the cellular, tissue, and whole-body metabolism and function of nutrients Audience: Undergraduate

2. Identify key elements of digestive anatomy that enable digestion and absorption of consumed nutrients Audience: Undergraduate

3. Recall and summarize the physiological processes required for assimilation of consumed macro- and micro-nutrients Audience: Undergraduate

4. Identify similarities and differences in nutritional and metabolic strategies across species Audience: Undergraduate

5. Evaluate the interactions between nutrients, animals, environment, physiological status and functions and integrate these interactions to understand whole-animal nutrition Audience: Undergraduate

#### AN SCI 314 – POULTRY NUTRITION

3 credits.

Provides a conceptual understanding of nutrient requirements for optimal growth and production of commercial poultry species. The use of computer programming for feed formulation is emphasized. **Requisites:** DY SCI/AN SCI 101

Repeatable for Credit: No

#### Last Taught: Summer 2019

**Learning Outcomes:** 1. Describe fundamental concepts of metabolizable energy, protein/amino acids, minerals and vitamins, digestive physiology, and their application in commercial poultry nutrition. Audience: Undergraduate

2. Use a computer-based formulation program for least cost formulation of diets for poultry. Audience: Undergraduate

3. Design effective poultry nutrition experiments and summarize and interpret the results of the experiments. Audience: Undergraduate

4. Describe basic and practical aspects of feed milling/manufacturing Audience: Undergraduate

5. Describe feeding programs for organic poultry production and production of niche poultry products and the use of feed additives in these programs Audience: Undergraduate

# AN SCI 315 – POULTRY ENTERPRISE MANAGEMENT

3 credits.

Fundamental business and economic principles and practices for successful poultry production with emphasis on problem solving in flock management.

Requisites: DY SCI/AN SCI 101 Repeatable for Credit: No Last Taught: Summer 2019 Learning Outcomes: 1. Demonstrate a systematic approach to decision making within the poultry industry. Audience: Undergraduate

2. Characterize fundamental business aspects for many segments of the poultry industry. Audience: Undergraduate

3. Apply basic knowledge of the poultry industry for use in problemsolving. Audience: Undergraduate

4. Demonstrate proper interviewing skills relevant to securing a career in the poultry industry. Audience: Undergraduate

5. Describe key areas of emotional intelligence and personality traits and how they can impact employer/employee relationships. Audience: Undergraduate

6. Develop a basic poultry operation business plan. Audience: Undergraduate

### AN SCI/DY SCI 320 - ANIMAL HEALTH AND DISEASE

3 credits.

Provides an introduction to and exploration of the interconnectivity between factors that affect health and disease and the central role of the immune system using infectious disease in animals as a key focus. Explores principal causes and identification of animal diseases, common diseases of farm animals, zoonoses and public health, disease prevention and management including biosecurity measures and host immune responses. Fosters appreciation for the translatability and universality of knowledge between human and animal health and disease.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 151, (ZOOLOGY/ BIOLOGY 101 and 102), BIOCORE 383, or graduate/professional standing Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

#### Repeatable for Credit: No

Last Taught: Spring 2024

Learning Outcomes: 1. Describe the interconnectivity and interdependence between factors that influence health and disease. Audience: Both Grad Undergrad

2. Discuss fundamental biological and scientific concepts valuable for a career in animal agriculture, veterinary medicine, human medicine or biomedical animal research Audience: Both Grad Undergrad

3. Translate novel knowledge of health and disease in one species to another. Audience: Both Grad Undergrad

4. Integrate concepts covered in the course and explore in depth how they are relevant to a specific challenge currently faced in animal health or disease. Audience: Graduate

#### AN SCI/FOOD SCI 321 - FOOD LAWS AND REGULATIONS 1 credit

Food laws and regulations, regulatory and commerical grading standards used in the food industry.

Requisites: Junior standing Repeatable for Credit: No Last Taught: Spring 2024

## AN SCI/BOTANY/MICROBIO 335 - THE MICROBIOME OF PLANTS, ANIMALS, AND HUMANS

3 credits

Examination of the structure and function of microbial communities that live inside and on host organisms (plants, animals, and humans). Introduction to general concepts of the microbiome and microbiota, and their relationship to host nutrition, health, and disease.

**Requisites:** MICROBIO 101 or 303 or graduate/professional standing Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci rea

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S Repeatable for Credit: No Last Taught: Spring 2024

#### AN SCI 336 – ANIMAL GROWTH AND DEVELOPMENT 3 credits.

Covers growth and development of an animal from a single cell to an organism and factors such as nutrition, hormone, genetics and gut microbials influencing growth and development in both cell and tissue levels. Includes the molecular and cellular basis of prenatal and postnatal growth and development. Focuses on development and growth of tissues including muscle, adipose, connective, mammary, and bone tissues that are associated with animal production. Also includes the use of growth promotants in livestock to improve growth performance and increase the quality of carcasses and animal production.

Requisites: (ZOOLOGY/BIOLOGY/BOTANY 151 and 152), (ZOOLOGY/ BIOLOGY 101 and 102), or BIOCORE 383

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci rea

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S Repeatable for Credit: No Last Taught: Fall 2023

Learning Outcomes: 1. Describe the process of growth and development from a single cell level to a whole organism level Audience: Undergraduate

2. Describe the principles and basic biological functions associated with animal growth and development applied to animal production systems Audience: Undergraduate

3. Explain what factors affect livestock growth and development and how alteration of these factors impacts growth performance of livestock Audience: Undergraduate

4. Integrate and apply multi-disciplinary knowledge acquired from this course to estimate and enhance growth and efficiency of animal products Audience: Undergraduate

#### AN SCI/BSE 344 – DIGITAL TECHNOLOGIES FOR ANIMAL MONITORING

3 credits.

Introduces key concepts of sensor technology used for livestock and companion animal monitoring and veterinary medicine. Describes applications of Artificial Intelligence (AI) systems for livestock animals and veterinary medicine, including animal monitoring, computer-aided diagnosis, and optimized farm management decisions.

**Requisites:** (MATH 112, 114, 171, or placement into MATH 221) or graduate/ professional standing

Repeatable for Credit: No

Last Taught: Spring 2024

**Learning Outcomes:** 1. Explain what precision livestock is and why it is needed Audience: Undergraduate

2. Demonstrate familiarity with data science and artificial intelligence principles as applied to agricultural systems and veterinary medicine Audience: Undergraduate

3. Describe the current sensor sensing technologies used in livestock and companion animals Audience: Undergraduate

4. Explain principles and applications of sensor technology applied to animals Audience: Undergraduate

5. Identify artificial intelligence applications in veterinary medicine Audience: Undergraduate

6. Evaluate the major ethical concerns associated with Artificial Intelligence for agriculture Audience: Undergraduate

# AN SCI/DY SCI 361 – INTRODUCTION TO ANIMAL AND VETERINARY GENETICS

2 credits.

The molecular basis for inheritance of monogenic and polygenic traits related to animal disease and production. An introduction to the principles of improving animal health and performance by selection and mating systems in companion animals, horses, livestock, and poultry.

**Requisites:** ZOOLOGY/BIOLOGY/BOTANY 151, (ZOOLOGY/ BIOLOGY 101 and 102), or (BIOCORE 382, 383, and 384) or graduate/ professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

**Learning Outcomes:** 1. Retrieve, analyze and interpret gene and genomic data for species conservation, genetic variants and gene function Audience: Both Grad Undergrad

2. Apply genotype data to determination of animal parentage and mapping of variants underlying genetic variation for animal traits Audience: Both Grad Undergrad

3. Articulate knowledge of methods used to discover and modify genetic information for purposes of altering phenotypes Audience: Both Grad Undergrad

4. Identify the key components of the basic genetic model describing the expression of phenotypic traits Audience: Both Grad Undergrad

5. Explain the four forces that change gene frequency: selection, drift, mutation and migration Audience: Both Grad Undergrad

6. Calculate and interpret the coe#cients of a simple linear regression determine the expected genetic change from phenotypic selection Audience: Both Grad Undergrad

7. Calculate the detection probability of a recessive genotype for some simple mating systems Audience: Both Grad Undergrad

8. Examine opportunities for genetic improvement of a trait in a species of interest using knowledge gained in the course, comparing alternative strategies and expected outcomes with the results of their analysis presented as a ten page term paper Audience: Graduate

#### AN SCI/DY SCI 362 – VETERINARY GENETICS

2 credits.

The genetic basis for predisposition to diseasse or resistance to disease in livestock and companion animal species. Genetic defects, their discovery, diagnosis and treament.

Requisites: DY SCI/AN SCI 361

Course Designation: Grad 50% - Counts toward 50% graduate

coursework requirement

Repeatable for Credit: No Last Taught: Spring 2024

**Learning Outcomes:** 1. Evaluate critically the primary literature in the genetic variants and their role in animal phenotypes and disease Audience: Both Grad Undergrad

2. Describe how gene x environment interactions affect gene expression and how these effects can be transmitted to the next generations Audience: Both Grad Undergrad

3. Use animal biotechnology knowledge and biomedical models to design experiments to treat animal diseases and alter phenotypes Audience: Both Grad Undergrad

4. Explain the processes by which epigenetic marks regulate gene expression and how these marks can be manipulated Audience: Both Grad Undergrad

5. Generate a hypothesis from a set of observations related to the genetic basis of animal production and then design experiments to test the hypothesis Audience: Graduate

# AN SCI/DY SCI 363 – PRINCIPLES OF ANIMAL BREEDING 2 credits.

Application of the principles of quantitative genetics to the improvement of livestock and poultry; breeding value estimation and selection techniques; effects of inbreeding and hybrid vigor; crossbreeding systems. **Requisites:** DY SCI/AN SCI 361

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

**Learning Outcomes:** 1. Calculate and interpret the values of narrow and broad sense herdabilities as well as repeatability of quantitative traits given their genetic and environmental variance components Audience: Both Grad Undergrad

2. Apply additive and multiplicative adjustments on phenotypic traits to correct for environmental effects Audience: Both Grad Undergrad

3. Interpret key components of sire summaries Audience: Both Grad Undergrad

4. Calculate expected correlated response to selection Audience: Both Grad Undergrad

5. Calculate retained hybrid vigor for various crossbreeding schemes in livestock Audience: Both Grad Undergrad

6. Perform quantitative genetic analysis of family data using linear regression and analysis of variance techniques Audience: Graduate

#### AN SCI 366 – CONCEPTS IN GENOMICS

3 credits.

Genomics has revolutionized many fields of science, including animal breeding, plant breeding, physiology, microbiology, and human medicine. A basic overview of the latest concepts in genomics, including 3D genome organization, the importance of genome annotation, the use of genomic testing in plant and animal breeding, the potential of genomic prediction on human medicine, and the latest advances in omics integration. **Requisites:** Junior Standing and BOTANY/BIOLOGY/ZOOLOGY 152, (BIOLOGY/ZOOLOGY 101, 102, and BIOLOGY/BOTANY 130), BIOCORE 381, or graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** No Last Taught: Fall 2023

**Learning Outcomes:** 1. Recognize the importance of functional annotation\\n Audience: Both Grad Undergrad

2. Explain the principles of gene mapping and genomic testing Audience: Both Grad Undergrad

3. Describe the impact of genomic selection on agriculture\\n Audience: Both Grad Undergrad

4. Recognize the potential of genomic prediction on human medicine Audience: Both Grad Undergrad

5. Describe the lastest advances in multi-omics data integration\\n Audience: Both Grad Undergrad

6. Explain the principles of pathway analysis and network inference Audience: Graduate

7. Describe available tools and software for omics analyses Audience: Graduate

# AN SCI/DY SCI 370 – LIVESTOCK PRODUCTION AND HEALTH IN AGRICULTURAL DEVELOPMENT

3 credits.

Physical, biological and social nature of animal agriculture systems and their improvement in developing countries; analysis of the state of livestock research and development in the developing countries and the world role of U.S. animal agriculture.

**Requisites:** DY SCI/AN SCI 101, ZOOLOGY/BIOLOGY/BOTANY 151, ZOOLOGY/BIOLOGY 101, or (BIOCORE 381 and 382), or graduate/ professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No Last Taught: Fall 2023

## AN SCI/DY SCI 373 – ANIMAL PHYSIOLOGY

3 credits.

Covers physiological processes that regulate the body and the anatomy and function of different physiological systems. Includes interactions between organ systems, analysis of a single organ system from the molecular to the organismal, and comparisons and contrasts of organ systems among different domestic animal species.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 151, (ZOOLOGY/ BIOLOGY 101 and 102), or BIOCORE 383

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** No Lest Taught: Spring 2024

Last Taught: Spring 2024

#### AN SCI 375 - SPECIAL TOPICS

1-4 credits.

Various topics in Animal Science of current interest to undergraduate students.

Requisites: None

**Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024

**Learning Outcomes:** 1. Analyze concepts and processes related to specific topics in Animal Sciences. \\n Audience: Undergraduate

2. Integrate and apply knowledge to understand issues associated with in animal industries. Audience: Undergraduate

3. Synthesize scientific literature to develop critical thinking skills. Audience: Undergraduate

#### AN SCI 377 – INTEGRATIVE ANIMAL PHYSIOLOGY LABORATORY 1 credit.

Provides immersive, hands-on training in large animal procedural and surgical techniques to develop knowledge and appreciation for the interconnectivity and interdependence between physiological processes of the various organ systems. Serves as an introduction to translatable skills for careers in biomedical animal research, veterinary medicine, or human medicine.

Requisites: ZOOLOGY/BIOLOGY/BOTANY 151, (ZOOLOGY/ BIOLOGY 101 and 102), or BIOCORE 383

### Repeatable for Credit: $\ensuremath{\mathsf{No}}$

**Learning Outcomes:** 1. Describe the interconnectivity and interdependence between physiological processes and anatomical systems. Audience: Undergraduate

2. Perform basic techniques in animal handling, anesthesia, and surgical procedures. Audience: Undergraduate

3. Communicate information and thoughts effectively within a team performing complex procedures. Audience: Undergraduate

#### AN SCI 399 – COORDINATIVE INTERNSHIP/COOPERATIVE EDUCATION

1-8 credits.

An internship under guidance of a faculty or instructional academic staff member in Animal and Dairy Sciences and internship site supervisor. Students are responsible for arranging the work and credits with the faculty or instructional academic staff member and the internship site supervisor.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Workplace - Workplace Experience Course

Repeatable for Credit: Yes, unlimited number of completions Last Taught: Spring 2024

Learning Outcomes: 1. Establish a network of mentors to support academic and professional growth. Audience: Undergraduate

2. Develop and illustrate specialized skills relavant to the focus of study associated with internship program. Audience: Undergraduate

3. Differentiate a diversity of disciplinary approaches and viewpoints in the agriculture industry. Audience: Undergraduate

#### AN SCI 400 – STUDY ABROAD IN ANIMAL SCIENCES 1-6 credits.

Provides an area equivalency for courses taken on Madison Study Abroad Programs that do not equate to existing UW courses. Requisites: None

Repeatable for Credit: Yes, unlimited number of completions

#### AN SCI/DY SCI 414 – RUMINANT NUTRITION & METABOLISM 3 credits.

Integrates nutritional and biochemical concepts to understand digestive and metabolic processes in dairy and beef cattle, which are then quantitatively represented to predict and manipulate production and health outcomes.

Requisites: DY SCI/AN SCI/NUTR SCI 311, (BIOCHEM 301 or 501) or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S Grad 50% - Counts toward 50% graduate coursework requirement

#### Repeatable for Credit: No

Last Taught: Fall 2023

### AN SCI 415 – APPLICATION OF MONOGASTRIC NUTRITION PRINCIPLES

2 credits.

Nutrient requirements for growth and production of monogastric animals. Discuss concepts of establishing nutrient requirements and feeding strategies. Laboratory exercises are designed to develop problem solving skills required for the assessment of nutritional adequacy and economical soundness of feeding programs.

Requisites: DY SCI/AN SCI/NUTR SCI 311, (BIOCHEM 301 or 501) or graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

#### Repeatable for Credit: No

Last Taught: Fall 2023

Learning Outcomes: 1. Identify classifications and profiles of major feed ingredients used to supply nutrients for monogastric animals Audience: Both Grad Undergrad

2. Assess the major nutrient requirements for monogastric animals established by empirical experimental methods Audience: Both Grad Undergrad

3. Build spreadsheets to calculate mathematical solutions required for formulations of complete diets for monogastric animals Audience: Both Grad Undergrad

4. Design an experiment and critique the results Audience: Both Grad Undergrad

5. Participate in discussions of laboratory assignments and presentations of experimental results Audience: Both Grad Undergrad

6. Provide a completed statistical analysis of the data from the animal trials with a defense for the analysis provided in the oral presentation Audience: Graduate

#### AN SCI 420 – MICROBIOMES OF ANIMAL SYSTEMS 3 credits.

Provides a knowledgebase in both theoretical and applied scientific approaches associated with microbiome sciences in animal production systems. Covers the basic principles of microbiology through applied practical approaches in using cross-species comparisons in companion and agricultural species from classical microbiological techniques to novel next-generation sequence-based approaches.

**Requisites:** (BIOLOGY/ZOOLOGY 101 and 102, BOTANY/BIOLOGY/ ZOOLOGY 151, BOTANY/BIOLOGY 130, or BIOCORE 383) and (CHEM 341, 343, or BIOCHEM 301), or graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

#### Last Taught: Spring 2024

**Learning Outcomes:** 1. Compare and contrast the anatomic differences and basic functions of the GI tract across agricultural species. Audience: Both Grad Undergrad

2. Apply biochemical concepts to evaluate the impact of substrates on microbial bioenergetics, growth yield, and the establishment and stability of microbial communities Audience: Both Grad Undergrad

3. Evaluate and recommend approaches to assess microbiome diversity and function. Audience: Both Grad Undergrad

4. Relate basic principles of microbial community membership and function in the context of host-microbe crosstalk. Audience: Both Grad Undergrad

5. Associate internal versus external environmental pressures that influence microbial niches and cross-kingdom interactions. Audience: Both Grad Undergrad

6. Critically evaluate key literature related to studying the microbiome of animal systems Audience: Graduate

#### AN SCI 431 – BEEF CATTLE PRODUCTION

3 credits.

Application of genetics, systems of mating, physiology, nutrition and economics to the production of beef. **Requisites:** NUTR SCI/AN SCI/DY SCI 311, DY SCI/AN SCI 361, and

(DY SCI/AN SCI 434 or concurrent registration) or graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement Repeatable for Credit: No Last Taught: Fall 2022

#### AN SCI 432 – SWINE PRODUCTION

3 credits.

Application of research findings in breeding, feeding, management and marketing to modernize production. Lab may include farm visits, practical exercises in testing changes, and "tools" used by producers. **Requisites:** NUTR SCI/AN SCI/DY SCI 311, DY SCI/AN SCI 361, DY SCI/ AN SCI 434, or graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** No **Last Taught:** Spring 2022

#### AN SCI/DY SCI 434 – REPRODUCTIVE PHYSIOLOGY

3 credits.

Principles of reproductive physiology, improvement of fertility, and artificial insemination.

**Requisites:** ZOOLOGY/BIOLOGY/BOTANY 152, (ZOOLOGY/ BIOLOGY 101 and 102) or (BIOCORE 382, 383, and 384) or graduate/ professional standing

**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S Grad 50% - Counts toward 50% graduate coursework requirement

### Repeatable for Credit: No

#### Last Taught: Fall 2023

**Learning Outcomes:** 1. Identify structures and function of reproductive anatomy in the male and female of all livestock species, humans, pets and wildlife Audience: Both Grad Undergrad

2. Identify hormones, their production site, physiology impacts and how to manipulate specific hormones to control reproduction either positively or negatively Audience: Both Grad Undergrad

3. Summarize critical components of reproductive technologies involved in breeding, semen collection, gamete biology and embryonic development. Demonstrate ability to monitor and manipulate cyclicity, artificial insemination, and pregnancy detection in both horses and pigs Audience: Both Grad Undergrad

4. Summarize events in reproduction from the cellular to whole animal level in livestock species, humans, pet species and wildlife Audience: Both Grad Undergrad

5. Communicate via oral, written, podcast, and website modalities Audience: Both Grad Undergrad

6. Solve reproductive physiology problems associated with a foreign country or novel region of U.S. including how to digitally communicate with local residents who may not speak English Audience: Both Grad Undergrad

7. Identify how ethical issues in global agriculture, wildlife management, and federal grazing lands impact reproductive management of livestock Audience: Both Grad Undergrad

8. Evaluate effective learning outcomes of a specific lab and access its impact on undergraduate students Audience: Graduate

#### AN SCI 435 – ANIMAL SCIENCES PROSEMINAR 2 credits.

Methods of assessing information quality are studied. Each student develops an analytical and critical seminar on a topic of personal interest in the animal sciences. **Requisites:** None **Repeatable for Credit:** No

#### Last Taught: Fall 2023

**Learning Outcomes:** 1. Apply the knowledge and skills acquired in the different areas of Animal Sciences to solve a specific problem using a multidisciplinary approach Audience: Undergraduate

2. Analyze academic, professional, societal, economic, ethical, or scientific issues related to Animal Science and construct creative solutions for those issues Audience: Undergraduate

3. Communicate and extend the capstone experience to refine research skills and demonstrate proficiency in written and oral forms Audience: Undergraduate

4. Extend academic experience acquired in the Animal Sciences department into areas of personal interest and develop new ideas working with academic and industrial organizations. Audience: Undergraduate

### AN SCI/DY SCI/FOOD SCI/SOIL SCI 472 – ANIMAL AGRICULTURE AND GLOBAL SUSTAINABLE DEVELOPMENT

1 credit.

Examines issues related to global agriculture and healthy sustainable development. Using a regional approach and focusing on crops and livestock case studies, students will learn the interdependence between US agriculture and agriculture in emerging economies. Some topics covered include population and food, immigration, the environment; crop and livestock agriculture; global trade; sustainability; food security, the role of women in agriculture, and the role of dairy products in a healthy diet. **Requisites:** None

**Repeatable for Credit:** No **Last Taught:** Spring 2024

### AN SCI/DY SCI/FOOD SCI/SOIL SCI 473 – INTERNATIONAL FIELD STUDY IN ANIMAL AGRICULTURE AND SUSTAINABLE DEVELOPMENT

2 credits.

Examines issues related to global agriculture and healthy sustainable development. Using a regional approach and focusing on crops and livestock case studies, students will learn the interdependence between US agriculture and agriculture in emerging economies. Some topics covered include population and food, immigration, the environment; crop and livestock agriculture; global trade; sustainability; and the role of women in agriculture and the role of dairy products in a healthy diet. **Requisites:** DY SCI/AN SCI/FOOD SCI/SOIL SCI 472 **Repeatable for Credit:** No

#### AN SCI 503 - AVIAN PHYSIOLOGY

3 credits.

Principles of organ and system function with emphasis on male and female reproduction, embryonic development and factors affecting hatchability. **Requisites:** DY SCI/AN SCI 101

Repeatable for Credit: No

#### Last Taught: Summer 2019

**Learning Outcomes:** 1. Describe the major functions and processes associated with behavior, nervous, muscular, cardiovascular, immune, digestive, endocrine and reproductive system. Audience: Undergraduate

2. Describe physiological processes that are unique to avian species and that provide challenges and opportunities for housing and management in the poultry industry. Audience: Undergraduate

3. Critically evaluate and communicate both verbally and written scientific research that integrates physiological concepts discussed in class. Audience: Undergraduate

#### AN SCI 508 – POULTRY PRODUCTS TECHNOLOGY

3 credits.

Procurement, processing and distribution of poultry meat, eggs and derived products; factors affecting quality, including methods of determining quality.

**Requisites:** CHEM 103, 109, or 115 **Repeatable for Credit:** No

Last Taught: Summer 2019

**Learning Outcomes:** 1. Relate physiological processes during animal growth and tissue harvest to quality attributes in the resulting food Audience: Undergraduate

2. Utilize principles of pH, ionic strength, isoelectric point, fermentation, curing, temperature, antimicrobial use, and antioxidant technology to\ \nensure that manufactured products are safe to eat, have the desired sensory attributes, and have extended shelf life Audience: Undergraduate

3. Differentiate function(s) from sensory e#ect(s) for the wide range of ingredients found on labels of various meat products Audience: Undergraduate

4. Identify the various chemical, physical, and thermal processes that go into producing a high-quality product with emphasis on how the order of each process during manufacturing is relevant Audience: Undergraduate

5. Measure quality attributes of the di#erent products produced in the laboratory segments Audience: Undergraduate

#### AN SCI 511 – BREEDER FLOCK AND HATCHERY MANAGEMENT 3 credits.

History of artificial incubation relevant to the U.S. hatching industry. Practices involved in successful incubation of hatching eggs. Embryonic development in birds. Management factors involved in breeder hen production and operating a hatchery.

Requisites: DY SCI/AN SCI 101 Repeatable for Credit: No Last Taught: Summer 2019 Learning Outcomes: 1. Identify normal incubation requirements and

problems associated with improper conditions. Audience: Undergraduate

2. Evaluate biosecurity plans and measures of microbial cleanliness of hatcheries. Audience: Undergraduate

3. Identify current management systems for poultry breeding flocks and understand differences among different species. Audience: Undergraduate

4. Apply knowledge of incubation and breeder management systems to analyze industry situations. Audience: Undergraduate

## AN SCI 512 – MANAGEMENT FOR AVIAN HEALTH

3 credits.

The occurrence, etiology, clinical signs, control and prevention of infectious and noninfectious diseases commonly affecting domestically reared poultry. Instruction in avian necropsy, zoonosis, sanitation and regulation.

Requisites: DY SCI/AN SCI 101

Repeatable for Credit: No

Last Taught: Summer 2019

**Learning Outcomes:** 1. Identify and describe the origins of disease, methods to control infections through immunological function, vaccination, sanitation, biosecurity, and regulatory agency response Audience: Undergraduate

2. Identify and distinguish normal and abnormal signs caused by disease Audience: Undergraduate

3. Describe the microbial world of infectious disease Audience: Undergraduate

4. Explain human's role in transmission of disease Audience: Undergraduate

5. Develop a visual understanding of gross lesions caused by disease Audience: Undergraduate

# AN SCI/FOOD SCI 515 - COMMERCIAL MEAT PROCESSING

2 credits.

Principles and procedures in the commercial manufacture of processed meat products; sausage manufacturing, curing, smoking, freezing and packaging.

Requisites: AN SCI/FOOD SCI 305, FOOD SCI 410, or graduate/ professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No Last Taught: Spring 2024

#### AN SCI/F&W ECOL/ZOOLOGY 520 - ORNITHOLOGY 3 credits.

Introduction to bird biology, ecology, and behavior. Topics include the evolutionary origin of birds and flight, anatomy and physiology, functional morphology, migration, communication, reproductive strategies, ecological adaptations and roles, and biogeographical patterns. Requisites: ZOOLOGY/BIOLOGY 101 and 102, ZOOLOGY/BIOLOGY/ BOTANY 152, (BIOCORE 381 and 382), or graduate/professional standing Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S Grad 50% - Counts toward 50% graduate coursework requirement Repeatable for Credit: No Last Taught: Spring 2024

### AN SCI/F&W ECOL/ZOOLOGY 521 - BIRDS OF SOUTHERN WISCONSIN

3 credits.

Outdoor and indoor labs/lectures emphasizing identification of southern Wisconsin birds by sight and vocalization. Two required Saturday field trips in Southern Wisconsin.

Requisites: ZOOLOGY/BIOLOGY 101 and 102, ZOOLOGY/BIOLOGY/ BOTANY 152, (BIOCORE 381 and 382), or graduate/professional standing Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S Grad 50% - Counts toward 50% graduate coursework requirement Repeatable for Credit: No

Last Taught: Spring 2024

### AN SCI 610 – QUANTITATIVE GENETICS

3 credits.

An advanced approach with emphasis on statistical foundations. Classical theory with extensions to maternal and paternal effects. Selection theory is considered in depth.

Requisites: Graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci rea

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S Grad 50% - Counts toward 50% graduate coursework requirement

#### Repeatable for Credit: No Last Taught: Fall 2023

Learning Outcomes: 1. demonstrate an understanding regarding the various components contributing to variation of phenotypic traits Audience: Graduate

2. estimate basic genetic parameters of phenotypic traits using family data Audience: Graduate

3. compare different selection strategies in terms of expect genetic change Audience: Graduate

4. perform gene mapping using molecular marker data Audience: Graduate

5. examine and critically evaluate technical literature related to quantitative genetics Audience: Graduate

6. assess advantages and disadvantages of indirect genetic selection Audience: Graduate

7. perform mixed model analysis to infer variance components and to compute estimated breeding values Audience: Graduate

#### AN SCI/AGRONOMY/GENETICS/HORT 615 - GENETIC MAPPING 3 credits.

Computing-intensive course to prepare students for genetic mapping research; linkage analysis and QTL mapping in designed crosses; linkage disequilibrium and association analysis (GWAS). Recommended preparation is undergraduate courses in genetics and statistics and prior experience writing R scripts (such as module 1 of STAT 327). **Requisites:** Graduate/professional standing Course Designation: Grad 50% - Counts toward 50% graduate

coursework requirement Repeatable for Credit: No Last Taught: Spring 2023

## AN SCI/NUTR SCI 626 – EXPERIMENTAL DIET DESIGN

1 credit.

Discuss nutrient requirements, composition of ingredients used to meet requirements and the mathematical steps involved in diet formulation with emphasis on research animals and human subjects.

**Requisites:** Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate

coursework requirement

Repeatable for Credit: No

#### Last Taught: Fall 2023

**Learning Outcomes:** 1. Develop an understanding of nutrient requirements, ingredients used to meet requirements, and the mathematical steps involved in diet formulation, with emphasis on research animals. Audience: Both Grad Undergrad

2. Develop skills required to formulate and prepare research diets Audience: Both Grad Undergrad

3. Develop an appreciation of nutrient requirements and the nutrient content of foods in development of healthy human diets. Audience: Graduate

#### AN SCI 681 – SENIOR HONOR THESIS

2-4 credits.

Individual study for majors completing theses for Honors degrees as arranged with a faculty member.

Requisites: Consent of instructor Course Designation: Honors - Honors Only Courses (H) Repeatable for Credit: No Last Taught: Spring 2024

## AN SCI 682 – SENIOR HONORS THESIS

2-4 credits.

Second semester of individual study for majors completing theses for Honors degrees as arranged with a faculty member. **Requisites:** Consent of instructor **Course Designation:** Honors - Honors Only Courses (H)

**Repeatable for Credit:** Yes, unlimited number of completions Last Taught: Fall 2023

#### AN SCI 691 – THESIS

2 credits.

Individual study for majors completing theses as arranged with a faculty member. **Requisites:** Consent of instructor

**Repeatable for Credit:** No **Last Taught:** Fall 2022

### AN SCI 692 – THESIS

2 credits.

Second semester of individual study for majors completing theses as arranged with a faculty member. **Requisites:** Consent of instructor **Repeatable for Credit:** No **Last Taught:** Spring 2023

#### AN SCI 699 – SPECIAL PROBLEMS

1-3 credits.

Individual advanced work in an area of Animal Sciences under the direct guidance of a faculty member.

Requisites: Consent of instructor Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S **Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024

# AN SCI/FOOD SCI 710 – CHEMISTRY OF THE FOOD LIPIDS 2 credits.

Chemical constitution, structures, reactions, stereochemistry of fats, phospholipids, related compounds; methods of isolation, characterization; synthesis; relation of structure to physical properties. **Requisites:** Graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** No **Last Taught:** Fall 2021

#### AN SCI/FOOD SCI 711 – FOOD BIOCHEMISTRY 3 credits.

Explores methods for interrogating structure-function relationships, molecular profiles, and microstructure of foods. Provides hands-on experience using computational approaches to model protein-small molecule interactions, analysis of small molecules using high-resolution MS, and protein composition and morphology with fluorescence spectroscopy and microscopy. Knowledge of food chemistry or organic chemistry (such as FOOD SCI 410, CHEM 341, 343, or 345) required. **Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No Last Taught: Fall 2023

#### AN SCI 799 – PRACTICUM IN ANIMAL SCIENCES TEACHING

1-3 credits.

Instructional orientation to teaching at the higher education level in the agricultural and life sciences, direct teaching experience under faculty supervision, experience in testing and evaluation of students, and the analysis of teaching performance.

Requisites: Consent of instructor

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

#### Last Taught: Spring 2024

**Learning Outcomes:** 1. articulate learning goals of the practicum separately from the main educational goals of the course in which the practicum takes place; Audience: Graduate

2. gain experience in creating, revising, critiquing course syllabi, that is, get firsthand experience in developing course requirements and policies Audience: Graduate

3. develop a strategy process to align course materials and course assignments with course objectives. Audience: Graduate

4. practice teaching under distinct instructional modalities; lecture vs discussion vs labs; synchronous vs asynchronous remote instruction Audience: Graduate

5. prepare and implement lesson plans of a class period, a week of instruction, or a module of the class Audience: Graduate

6. acquire classroom management skills including how to deliver content, lead a discussion, handle questions and answers Audience: Graduate

7. develop both formative and summative evaluation instruments to gain feedback on how to assess and improve the teaching and learning process Audience: Graduate

#### AN SCI/DY SCI 824 – RUMINANT NUTRITIONAL PHYSIOLOGY I 4 credits.

Focuses on rumen microbiology, metabolite modeling, as well as protein and VFA nutrition and metabolism.

Requisites: Graduate/professional standing Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement Repeatable for Credit: No Last Taught: Fall 2022

#### AN SCI/DY SCI 825 – RUMINANT NUTRITIONAL PHYSIOLOGY II 4 credits.

Focuses on calf and heifer nutrition, regulation of dry matter intake, plant and forage chemistry, vitamins, lipids, and starch. **Requisites:** Graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** No

Last Taught: Fall 2023

#### AN SCI/GENETICS/POP HLTH 849 – GENETIC EPIDEMIOLOGY 3 credits.

This course will provide an introduction to genetic epidemiology. Topics will include a general overview of genetics and Mendelian and complex inheritance, as well as various elements of study design, including participant ascertainment; phenotype definition; biologic sample selection; genotyping, sequencing, and quality control; measurement of covariates, and choice of analytic methods. We will briefly discuss some of the original study designs and then focus on current study designs for the remainder of the class. Additional emerging topics will be briefly touched upon. Students will complete short homework assignments to enforce concepts learned during lectures, discuss journal articles, and prepare a very short grant application for the mid-term project. In the final weeks of class, students will work together to analyze data from a real genetic study, prepare tables, interpret the findings, and present their project to their peers.

**Requisites:** Graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate

coursework requirement Repeatable for Credit: No Last Taught: Spring 2024

# AN SCI 865 – DESIGN AND ANALYSIS OF BIOLOGICAL STUDIES 4 credits.

Experimental design and proper data analysis are critical processes for scientific research. Planning and performing research studies have statistical implications that influence how results are interpreted. Learn the fundamentals of generalized linear models, experimental design, and data analysis using common examples from biological studies. **Requisites:** Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate

coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

**Learning Outcomes:** 1. Use regression models properly Audience: Graduate

2. Select the most appropriate experimental design for a particular experiment Audience: Graduate

3. Select the most appropriate method of data analysis Audience: Graduate

4. Determine the most appropriate model that fits the data Audience: Graduate

5. Interpret the results of the data analysis Audience: Graduate

6. Use the statistical software R to analyze data Audience: Graduate

#### AN SCI 875 – SPECIAL TOPICS

1-4 credits.

Specialized subject matter of current interest to graduate students. **Requisites:** Graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024

**Learning Outcomes:** 1. Analyze and critique research results, interpretations and proposals. Audience: Graduate

2. Demonstrate critical thinking and knowledge about the significance of current research in the fields of animal and dairy science by presenting and/or critiquing scientific presentations Audience: Graduate

#### AN SCI/DY SCI 931 – SEMINAR IN ANIMAL NUTRITION 1 credit.

Discussion of literature that has a bearing on animal nutrition. Students are to survey the literature and present a seminar. **Requisites:** Graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024

# AN SCI/DY SCI/GENETICS 951 – SEMINAR IN ANIMAL BREEDING 0-1 credits.

Requisites: Graduate/professional standing Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement Repeatable for Credit: No Last Taught: Spring 2020

### AN SCI/OBS&GYN/ZOOLOGY 954 – SEMINAR IN ENDOCRINOLOGY-REPRODUCTIVE PHYSIOLOGY

0-1 credits.

Promotes scientific and professional development. Presenters develop and deliver research presentations to a scientific audience, field questions, and receive critiques about their presentation style and scientific approach. Additional presentations include professional development, career advancement opportunities, and topics of interest to the endocrinology and reproduction community at large. **Requisites:** Graduate/professional standing **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024

**AN SCI 990 – RESEARCH** 1-12 credits.

Independent research in preparation of a graduate thesis under supervision of a faculty member. **Requisites:** Consent of instructor **Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement **Repeatable for Credit:** Yes, unlimited number of completions **Last Taught:** Spring 2024