

DAIRY SCIENCE (DY SCI)

DY SCI 1 – COOPERATIVE EDUCATION/CO-OP IN DAIRY SCIENCE

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: Fall 2018

DY SCI/AN 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: Summer 2025

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

DY SCI/AN 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 2024

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

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

DY SCI 205 – DAIRY CATTLE IMPROVEMENT PROGRAMS

2 credits.

Dairy cattle evaluation and selection, including: linear type appraisal, dairy cattle judging, mating programs, breed comparisons, cattle marketing, and national genetic improvement programs.

Requisites: DY SCI/AN SCI 101

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Demonstrate knowledge about the organizations that play major roles in the US dairy cattle genetics industry.

Audience: Undergraduate

2. Apply dairy cattle appraisal systems for evaluating functional conformation.

Audience: Undergraduate

3. Use dairy management scorecards that contribute to animal welfare and productivity.

Audience: Undergraduate

4. Identify characteristics associated with the North American dairy breeds and analyze their genetic progress.

Audience: Undergraduate

5. Recognize factors that influence dairy cattle values for merchandising and herd management purposes.

Audience: Undergraduate

6. Integrate herd level genetic improvement strategies, including corrective mating systems, to foster genetic progress and achieve producer goals.

Audience: Undergraduate

DY SCI 233 – DAIRY HERD MANAGEMENT I

3 credits.

Overview of practical dairy herd management with components of reproduction, nutrition, milk quality, raising dairy replacements, facilities and records. Laboratories emphasize practical applications, analyses of alternatives and decision making.

Requisites: DY SCI/AN SCI 101

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Apply dairy management terms and systems to real-world situations.

Audience: Undergraduate

2. Evaluate farm management practices using dairy industry benchmarks.

Audience: Undergraduate

3. Identify, formulate and solve dairy management related problems using appropriate information and approaches.

Audience: Undergraduate

4. Assess effective dairy herd management using dairy records.

Audience: Undergraduate

5. Work productively in teams to provide constructive input and leadership on dairy management related problems.

Audience: Undergraduate

6. Communicate effectively through written reports, oral presentations and discussions.

Audience: Undergraduate

DY SCI 234 – DAIRY HERD MANAGEMENT II

3 credits.

The second of a two course sequence designed as an overview of practical dairy herd management with components of animal welfare and handling, health, calf and heifer rearing, facilities and production economics.

Laboratories emphasize practical applications, investigation of alternatives and decision making.

Requisites: DY SCI 233

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Apply dairy management terms and systems to real-world situations.

Audience: Undergraduate

2. Evaluate farm management practices using dairy industry benchmarks.

Audience: Undergraduate

3. Identify, formulate and solve dairy management related problems using appropriate information and approaches.

Audience: Undergraduate

4. Assess effective dairy herd management using dairy records.

Audience: Undergraduate

5. Work productively in teams to provide constructive input and leadership on dairy management related problems.

Audience: Undergraduate

6. Communicate effectively through written reports, oral presentations and discussions.

Audience: Undergraduate

DY SCI 289 – HONORS INDEPENDENT STUDY

1-2 credits.

Honors research work under direct guidance of a faculty member in an area of Dairy Science. 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 1998

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

DY SCI 299 – INDEPENDENT STUDY

1-3 credits.

Individual introductory to intermediate work under direct guidance of a faculty member in an area of Dairy Science. 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 2025

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

DY SCI/AN 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 2025

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. Explain the physiological processes required for assimilation of consumed macro- and micro-nutrients

Audience: Undergraduate

4. Compare the 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

DY SCI/AN 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 2025

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

DY SCI/AN 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 2025

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 coefficients of a simple linear regression to 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
Audience: Graduate

DY SCI/AN SCI 362 – VETERINARY GENETICS

2 credits.

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

Requisites: DY SCI/AN SCI 361 or concurrent enrollment

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

Repeatable for Credit: No

Last Taught: Spring 2025

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

DY SCI/AN 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 or concurrent enrollment

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

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Calculate and interpret the values of narrow and broad sense heritabilities 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

DY SCI/AN 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 2024

Learning Outcomes: 1. Describe the physical, biological and social nature of animal agriculture and its improvement in developing countries.

Audience: Both Grad & Undergrad

2. Analyze the constraints to improving livestock production on resource poor farms in developing countries.

Audience: Both Grad & Undergrad

3. Demonstrate knowledge about institutional infrastructures involved in research, education, and development projects in animal agriculture.

Audience: Both Grad & Undergrad

4. Develop skills needed to analyze and project strategies for improvement of a production system in a developing country.

Audience: Graduate

DY SCI/AN 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

Last Taught: Spring 2025

Learning Outcomes: 1. Integrate the physiological processes that regulate the body of different animal species (largely domestic animals and humans)

Audience: Undergraduate

2. Synthesize the regulation of an organ system from the molecular level all the way to the whole animal level and apply knowledge of a physiological mechanism to explain how a whole animal physiological process occurs

Audience: Undergraduate

3. Integrate interactions between different organ systems (homeostasis) and explain the anatomy of different physiological systems and their specific functions

Audience: Undergraduate

4. Determine how changes in internal or external environment will alter physiologic processes to deal with these changes

Audience: Undergraduate

5. Determine how changes in one physiological system may impact a different physiological system

Audience: Undergraduate

6. Describe similarities and differences in physiologic systems between animal species (with emphasis on domestic animals and humans)

Audience: Undergraduate

DY SCI 375 – SPECIAL TOPICS

1-4 credits.

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

Requisites: None

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

Learning Outcomes: 1. Explain concepts and processes related to specific topics in Dairy Science

Audience: Undergraduate

2. Integrate and apply knowledge to understand issues associated with in Dairy industry

Audience: Undergraduate

3. Synthesize scientific literature to develop critical thinking skills

Audience: Undergraduate

DY SCI 378 – LACTATION PHYSIOLOGY

3 credits.

Focuses on lactation physiology across mammalian species. Structure and function of mammary glands; hormonal control of mammary development and lactation; cellular mechanisms of milk synthesis; the chemistry of milk synthesis; mastitis and other abnormalities of mammary functions.

Requisites: (BIOCHEM 301, 501, BMOLCHEM 314, or concurrent enrollment) and (ZOOLOGY/BIOLOGY 101 and 102), ZOOLOGY/BIOLOGY/BOTANY 151, 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 2024

Learning Outcomes: 1. Explain mammary gland macro- and microanatomy and physiology

Audience: Undergraduate

2. Distinguish mammary gland development (in utero all the way through the lactation cycle)

Audience: Undergraduate

3. Explain the mechanisms governing mammalian milk synthesis and secretion

Audience: Undergraduate

4. Articulate the distinctive roles of systemic (i.e., hormonal) and local (i.e., autocrine) factors governing lactation and mammary gland development

Audience: Undergraduate

5. Discriminate components management interventions that might comprise or potentiate milk production in dairy cattle

Audience: Undergraduate

6. Assess the diseases that affect the mammary gland (i.e., mastitis) and learn proper milking routines to ensure high quality milk standard and welfare of dairy cattle

Audience: Undergraduate

7. Formulate a position on a research topic of societal debate using scientific literature and popular media

Audience: Graduate

8. Audit common dairy practices by evaluating the primary literature critically and using research-based knowledge acquired in class.

Audience: Graduate

DY 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 2025

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

Audience: Undergraduate

2. Develop and illustrate specialized skills relevant 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

DY SCI 400 – STUDY ABROAD IN DAIRY SCIENCE

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

DY SCI/AN 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 2024

Learning Outcomes: 1. Integrate nutritional and biochemical concepts to understand digestion and metabolism of nutrients.

Audience: Both Grad & Undergrad

2. Predict quantitative metabolic and production outcomes in ruminants.

Audience: Both Grad & Undergrad

3. Determine the role of metabolism in feed efficiency, animal production and health, and environmental load of ruminant production systems.

Audience: Both Grad & Undergrad

4. Investigate, interpret, summarize, and debate findings from scientific literature in order to develop and communicate recommendations for ruminant diets to identified audiences.

Audience: Both Grad & Undergrad

5. Apply research models to experimental and production data to predict metabolic outcomes

Audience: Graduate

DY SCI/AN 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 2024

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

DY SCI 471 – FOOD PRODUCTION SYSTEMS AND SUSTAINABILITY

3 credits.

Delves into aspects of natural sciences (biology and agricultural sciences) and social sciences underpinning the assessment of food production systems as related to a variety of outcomes including but not restricted to human and environmental health, air and water quality, greenhouse gases emission, land use, economic opportunity, social justice, as well as mitigation and adaptation to climate change, locally, regionally, domestically, across continents, and globally.

Requisites: (Graduate/professional standing) or junior standing and satisfied Quantitative Reasoning (QR) B requirement

Course Designation: Breadth – Either Biological Science or Social Science

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: Spring 2025

Learning Outcomes: 1. Explain the social, economic, and/or environmental dimension of sustainability challenges associated with food production systems.

Audience: Both Grad & Undergrad

2. Evaluate food production systems for their contribution to, mitigation potential of, and adaption to climate change.

Audience: Both Grad & Undergrad

3. Identify ways in which social structures profoundly affect not only people, but also biology, ecology, and our very climate. And the complement: how people's race/class/gender/occupation/nation status within the global social structure, as well as the nature of the global social structure itself, profoundly impacts their ability to cope with changing climate.

Audience: Both Grad & Undergrad

4. Critically evaluate the scientific literature and other sources of information related to the sustainability of food systems.

Audience: Both Grad & Undergrad

5. Analyze the causes of and solutions for the sustainability of food production, distribution, marketing, consumption, and waste disposal.

Audience: Both Grad & Undergrad

6. Develop analytical and problem-solving skills individually and in teams of classmates with diverse worldviews.

Audience: Both Grad & Undergrad

7. Communicate effectively information to multiple audiences through multiple medias

Audience: Both Grad & Undergrad

8. Develop an aptitude for working with mixed teams including undergraduate students

Audience: Graduate

9. Demonstrate research and writing skills to produce academically rigorous literature reviews

Audience: Graduate

DY SCI/AN 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

Learning Outcomes: 1. Apply sustainability principles and/or framework to addressing the challenge of feeding an increasing world population sustainably.

Audience: Undergraduate

2. Define and characterize sustainability, sustainable agriculture and Sustainable Development

Audience: Undergraduate

3. Analyze the contributions of animal agriculture to the Sustainable Development Goals both in developing and developed countries.

Audience: Undergraduate

4. Explain the social, economic, and/or environmental dimensions of the sustainability challenges of diverse animal agricultural systems both in developing and developed countries.

Audience: Undergraduate

5. Evaluate the role of livestock in communities where poverty, hunger and marginalization are embedded as a way of life.

Audience: Undergraduate

6. Critically evaluate the causes of –and ways to break– the chains of hunger and poverty among the poorest of the poor.

Audience: Undergraduate

DY SCI/AN 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

Learning Outcomes: 1. Improve communication and interpersonal skills associated with participating in team-based intercultural experiences

Audience: Undergraduate

2. Be better prepared for professional success in an interconnected world by navigating unfamiliar cultural norms and societal differences

Audience: Undergraduate

3. Reflect on US-centric personal and cultural values while building an appreciation and respect for the Latin America culture.

Audience: Undergraduate

4. Explain the social, economic, and/or environmental dimensions of the sustainability challenge of alleviating poverty and malnutrition in Mexico

Audience: Undergraduate

5. Apply sustainability principles and/or framework to addressing the challenge of fostering prosperity in marginalized indigenous communities

Audience: Undergraduate

6. Analyze both from their own disciplinary lens and from an interdisciplinary lens the contributions of dairy farming to the Sustainable Development Goals

Audience: Undergraduate

7. Evaluate the sustainability of subsistence, market-oriented, and industrial-scale farming systems

Audience: Undergraduate

DY SCI 534 – REPRODUCTIVE MANAGEMENT OF DAIRY CATTLE

3 credits.

Provides the technical knowledge and practical skills to design and execute an effective reproductive management program for dairy cattle. Study key reproductive physiology and practical research results that underlie reproductive management programs. Participate in hands-on laboratories to learn, practice, and demonstrate practical reproductive management techniques including: semen handling, artificial insemination, and ultrasound of ovaries and uterus.

Requisites: DY SCI/AN SCI 434

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

Repeatable for Credit: No

Last Taught: Spring 2024

Learning Outcomes: 1. Identify female reproductive tract structures, reproductive hormones, and know the changes during the estrous cycle

Audience: Both Grad & Undergrad

2. Design a reproductive management program for cows or heifers

Audience: Both Grad & Undergrad

3. Identify use of different pregnancy diagnosis procedures in a reproductive management program

Audience: Both Grad & Undergrad

4. Evaluate reproductive efficiency in dairy farms. Design new reproductive management programs based on evaluation of farm data

Audience: Both Grad & Undergrad

5. Design and execute a superovulation program

Audience: Both Grad & Undergrad

6. Describe process used for artificial insemination of dairy cattle

Audience: Both Grad & Undergrad

7. Describe and interpret an ultrasound of the ovaries and uterus of dairy cattle.

Audience: Graduate

8. Complete a research project using ultrasound

Audience: Graduate

DY SCI 535 – DAIRY FARM MANAGEMENT PRACTICUM

3 credits.

Principles of nutrition, breeding, reproduction, and management at the farm level are integrated. Develop skills in decision making, information gathering, problem solving, and interpersonal communication through field trips to working commercial dairy operations.

Requisites: DY SCI 234 or GRAD

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

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Identify, formulate and solve problems using appropriate information and approaches

Audience: Both Grad & Undergrad

2. Communicate effectively through written reports, oral presentations and discussions

Audience: Both Grad & Undergrad

3. Work effectively in teams to provide constructive input and leadership on dairy management related problems

Audience: Both Grad & Undergrad

4. Evaluate farm management and performance using dairy industry benchmarks

Audience: Both Grad & Undergrad

5. Demonstrate an understanding of business concepts and thinking

Audience: Both Grad & Undergrad

6. Synthesize knowledge and apply peer reviewed research to solve dairy management problems

Audience: Graduate

DY SCI 681 – SENIOR HONORS 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: Yes, unlimited number of completions

Last Taught: Fall 2024

Learning Outcomes: 1. Develop objectives and formulate hypothesis into experimental methods

Audience: Undergraduate

2. Participate in a supportive community of academically engaged peers

Audience: Undergraduate

3. Develop a research proposal and implement research project under supervision of an honors faculty mentor

Audience: Undergraduate

4. Demonstrate intellectual curiosity through engagement in challenging academic experiences

Audience: Undergraduate

DY 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: No

Last Taught: Spring 2025

Learning Outcomes: 1. Demonstrate advanced content knowledge as reflected in an honors thesis, publication, performance, or scholarly work.

Audience: Undergraduate

2. Articulate the value of the honors experience to peers and to a broader community

Audience: Undergraduate

DY SCI 699 – SPECIAL PROBLEMS

1-3 credits.

Individual advanced work in an area of Dairy 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: Summer 2025

Learning Outcomes: 1. Integrate and apply knowledge to understand issues associated with in Dairy industries or associated with animal scientific research

Audience: Undergraduate

2. Develop and illustrate specialize skills relevant to a focused body of work associated with a specific learning experience

Audience: Undergraduate

3. Report findings through divers means of communication

Audience: Undergraduate

4. Summarize intellectual growth associate with independent study work

Audience: Undergraduate

DY SCI 799 – PRACTICUM IN DAIRY SCIENCE 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 2025

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

DY SCI/AN 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 2024

Learning Outcomes: 1. Assess source, digestion, absorption, utilization, and metabolism of nutrients in ruminants

Audience: Graduate

2. Integrate concepts of carbon and nitrogen tracing and flux through ruminant body systems

Audience: Graduate

3. Develop a command of modeling nutrient flux through tissues and be able to apply and extrapolate concepts to nutrient utilization and tracing methodology

Audience: Graduate

4. Clearly communicate the conceptual basis, assumptions, and limitations of techniques and methodology necessary to quantify digestive and metabolic processes

Audience: Graduate

5. Evaluate nutritional recommendations and current topics in ruminant nutrition

Audience: Graduate

DY SCI/AN 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

Learning Outcomes: 1. Assess source, digestion, absorption, utilization, and metabolism of nutrients in ruminants

Audience: Graduate

2. Integrate concepts of carbon and nitrogen tracing and flux through ruminant body systems

Audience: Graduate

3. Develop a command of modeling nutrient flux through tissues and be able to apply and extrapolate concepts to nutrient utilization and tracing methodology

Audience: Graduate

4. Clearly communicate the conceptual basis, assumptions, and limitations of techniques and methodology necessary to quantify digestive and metabolic processes

Audience: Graduate

5. Evaluate nutritional recommendations and current topics in ruminant nutrition

Audience: Graduate

DY 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. Articulate 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

DY SCI 900 – SEMINAR

1 credit.

Comprehensive reviews of research aimed at broadening understanding of dairy science.

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 2025

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

Audience: Graduate

2. Articulate 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

DY SCI/AN 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

DY SCI/AN 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

DY 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: Summer 2025