

Animal Science (Biology & Technology)0110026120

Course Description

A course to help students understand the biological principles of animal production which will influence and affect animal management decisions. The course is modeled after the Animal Science 250 . Animal Management course offered at the University of Nebraska-Lincoln by Dr. Dennis Brink and Dr. Bryan Reiling.

Course Code:

Program(s) of Study to which This Course Applies

- Animal Systems

| Course Framework | Reference Standards | Academic Crosswalk |
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| Standard 1. Student will apply genetic principles in the selection and breeding of animals for food production and human welfare. | NAS Modification AS.05.03 | [TBD by NDE] |
| Benchmark 1.1 The student will select a breeding system based on the principles of genetics. <u>Sample performance indicators:</u> <ul style="list-style-type: none"> • Students will select breeding replacements from groups of animals. • Students will evaluate pedigrees and determine breeding systems utilized. • Students will determine probability of progeny based upon a Punnett square in different breeding systems. | NAS Modification AS.05.03.01c | [TBD by NDE] |
| Benchmark 1.2 The student will appraise animals based upon quantitative breeding values for specific characteristics. <u>Sample performance indicators:</u> <ul style="list-style-type: none"> • Students will appraise the value of breeding replacements relative to quantitative | NAS Modification AS.05.03.03c | [TBD by NDE] |

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| <p>breeding values (e.g. EPDs).</p> <ul style="list-style-type: none"> • Students will evaluate sires for economically important traits necessary in given scenarios. • Students will assess value of female replacements relative to productivity index values from a set of production data. | | |
| <p>Standard 2. Students will apply principles of physiology to conception, gestation, parturition and lactation in sound animal management practices.</p> | | [TBD by NDE] |
| <p>Benchmark 2.1 The student will identify anatomical components of the male and female reproductive systems of animals.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Diagram and describe the functions of the male and female reproductive systems of specific species of animals. • Select breeding animals based upon characteristics of the reproductive organs (e.g. scrotal circumference, pelvic measurement, breeding soundness exam data, and mammary system). • Students will compare motility and mobility of semen samples to determine probability of conception with local veterinarian. | NAS Modification AS.05.01.01b | [TBD by NDE] |
| <p>Benchmark 2.2 The student will identify the endocrine system and explain functions as affected by endocrine components.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Describe the structure of the endocrine glands. • Investigate the effects of hormones on reproduction. • Identify and explain the endocrine system of domestic animals. • Contrast the various estrous behavioral characteristics of diverse species. | L2L Modification AE.12.3.2 | |
| <p>Benchmark 2.3 The student will explain the biology of estrous synchronization, superovulation, embryo flushing, embryo transfer, and other reproductive management practices.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Compare and explain the various estrous synchronization systems. • Create a reproduction calendar and plan for a specific breeding scenario. | NAS Modification AS.05.03.04c | |

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| <ul style="list-style-type: none"> • Visit a facility to observe the various reproductive management practices. • Invite a veterinarian into your classroom to discuss the benefits and drawbacks of the various estrous synchronization techniques. • Debate embryo transfer and cloning feasibility as well as the ethical aspects to society. • Indicate the roles of ovarian structures to the estrous cycle and reproductive endocrinology. | | |
| <p>Benchmark 2.4 The student will explain the biology of reproductive management in various species.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Assess the role of artificial insemination in animal agriculture. • Demonstrate the proper artificial insemination techniques used in animal agriculture. • Visit a facility to observe correct artificial insemination techniques. • Identify commonly used artificial insemination equipment. | <p>NAS Modification AS.05.03.05b</p> | |
| <p>Benchmark 2.5 The student will explain the biology of gestation in various species.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Students will illustrate the different levels of hormones during the various stages of gestation. • Students will diagram fetal development during different stages of gestation. • Discuss the types of placenta in the various species. • Compare the number of offspring born in the various species. | <p>NAS Modification AS.05.03.01c</p> | <p>[TBD by NDE]</p> |
| <p>Benchmark 2.6 The student will explain the biology of parturition in various species.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Describe the various fetal presentations during parturition of various species and the dangers of this type of delivery. • Discuss the stages of the cervix during parturition. • Identify the equipment used during dystocia of various species. | <p>NAS Modification AS.05.03.03c</p> | <p>[TBD by NDE]</p> |
| <p>Benchmark 2.7 The student will explain the biology of lactation in various species.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Contrast levels of milk production in the various species. • Determine the percentage of water in whole milk. • Discuss the hormones responsible for milk letdown. | <p>UNL AniSci 250 Syllabus Modification</p> | |

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| <ul style="list-style-type: none"> Diagram the milk production curve and the associated hormones. | | |
| Standard 3. Students will apply principles of animal nutrition to ensure the proper growth, development, reproduction and economic production of animals. | NAS AS.04 | [TBD by NDE] |
| Benchmark 3.1 Compare and contrast the digestive systems of various species. <u>Sample performance indicators:</u> <ul style="list-style-type: none"> Match the nutrient requirements to various species in different stages of development or lactation. Compare and contrast the digestive systems of various species. | L2L Modification AE 12.3.2 | [TBD by NDE] |
| Benchmark 3.2 Estimate the nutritional requirements for different animal life processes (e.g. maintenance and homeostasis, growth, reproduction, lactation). <u>Sample performance indicators:</u> <ul style="list-style-type: none"> Match the nutrient requirements to various species in different stages of development or lactation. Match nutritional deficiencies or conditions to the symptoms being exhibited. Discuss performance issues affected by nutritional deficiencies. | L2L Modification AE 12.3. | [TBD by NDE] |
| Benchmark 3.3 Compare the various processing and packaging techniques used within the animal agriculture industry. <u>Sample performance indicators:</u> <ul style="list-style-type: none"> Determine the value of feedstuffs on a %drymatter+and %asfed+basis. Discuss the benefits and drawbacks of various packaging and processing techniques for both the producer and the consumer. (e.g. rolled corn vs. flaked corn, DDG vs. corn gluten meal). Identify equipment used for the various processing and packaging techniques. Compare the various feeding techniques for the different processed, packaged, and raw feedstuffs. Critique feed labels based upon nutritional needs of the species and stage of development. Determine the nutrient level of feedstuffs based upon the feed label. | UNL AniSci 250 Syllabus Modification | [TBD by NDE] |
| Benchmark 3.4 Formulate rations for specific species in various stages of development. | OHS Modification AS.1.1.7 | [TBD by NDE] |

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| <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Formulate a ration relative to the nutritional needs of the species and the stage of development. • Differentiate between feed additives, supplements, forages, and concentrates. • Determine the least cost ration relative to a selected scenario. • Utilize a computer program to calculate a least cost ration for a scenario or species. | | |
| <p>Standard 4. Students will recommend animal care practices and apply complex procedures to prevent diseases.</p> | <p>OHS Benchmark 1.3</p> | <p>[TBD by NDE]</p> |
| <p>Benchmark 4.1 Recognize and determine the living and non-living factors affecting of the animals susceptibility to disease.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Evaluate the abiotic (non-living) factors affecting conditions of a specific farm or scenario based upon environmental samples. • Recommend steps to correcting the detrimental conditions for a specific farm or scenario. • Evaluate the biotic (living) factors affecting conditions of a specific farm or scenario. | <p>OHS Modification 1.3.2</p> | <p>[TBD by NDE]</p> |
| <p>Benchmark 4.2 Describe sanitation, hygiene, and other activities used in the treatment or prevention of diseases or parasites</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Create a vaccination plan for a specific operation or scenario based upon historical data and current conditions. • Determine the withdrawal time necessary for various vaccinations or treatments according to label directions. • Identify diseases by case study. • Identify external parasites. • Collect fecal samples and determine threshold levels of parasites. • Visit with local veterinarian to determine a disease prevention plan specific to an operation or scenario. | <p>L2L Modification AE12.3.4</p> | <p>[TBD by NDE]</p> |
| <p>Standard 5. Students will apply principles of physiology to cellular growth and development in sound animal management practices.</p> | <p>UNL AniSci 250 Syllabus Modification</p> | <p>[TBD by NDE]</p> |

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| <p>Benchmark 5.1 Describe the growth of specific cells relative to maturity of the animal.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Create a growth curve comparing growth rates of different genders of the same species. • Describe the growth patterns of muscle, bone, and fat in relation to the maturity of the animal. | <p>UNL AniSci 250 Syllabus Modification</p> | |
| <p>Benchmark 5.2 Explain the impact of growth implants, supplements, and growth enhancers affect cell biology.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Determine the impact of growth enhancers relative to cell physiology. • Explain the practices of current animal management and the affect it has on the cell growth of species or gender. • Develop a list of the various growth implants, supplements, and growth enhancers available to producers. • Evaluate the impact of growth implants, supplements, and growth enhancers on the industry along with the corresponding benefits and the side effects. • Debate the current views of the consuming public in relation to growth implants, supplements, and growth enhancers in food production. | <p>UNL AniSci 250 Syllabus Modification</p> | |
| <p>Benchmark 5.3 Evaluate the impact of growth implants, supplements, and growth enhancers on the food quality from livestock through physiological cellular change, both perceived and real.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> • Compare the value of animal carcasses in various yield grade and quality grade scenarios. • Determine the impact of growth enhancers upon the endocrine system. • Evaluate carcass value discovery available to producers and the impact of leaner carcasses relative to consumer appeal. • Debate the merits of consumer appeal relative to price discovery of animal products (e.g. organic meat, milk, eggs, wool). • Determine the value of animal products based upon a grid pricing system. • Rank food products based upon the USDA grading system. | <p>UNL AniSci 250 Syllabus Modification</p> | |

Reference Standards Sources

- NAS = National Ag Standards
- L2L = Nebraska Links to Learn
- CAL = California Agriculture Education Standards
- OHS = Ohio Agriculture Education Standards
- tex = Texas Agriculture Education Standards

Other Information

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| Suggestions for innovative teaching and learning strategies: | <ul style="list-style-type: none"> • Field Experience • Classroom Visitors • Professional Presenters • Classroom Projects • Laboratory Practicum |
| Related assessments: | <ul style="list-style-type: none"> • FFA Livestock Management Career Development Event • FFA Livestock Selection Career Development Event • FFA Meat Identification and Evaluation Career Development Event • FFA Public Speaking Leadership Skills Event • FFA Agricultural Demonstration Leadership Skills Event • FFA Job Interview Leadership Skills Event • Premier Animal Science Event (4-H) |



Y **and Biotechnology**
Nebraska Programs of Study



Extended learning opportunities:

- Supervised Agricultural Experience within the livestock industry or other associated industry.
- 4-H/FFA Livestock Projects
- Internships
- State and National Conventions
- Nebraska Agricultural Youth Institute
- Professional Workshops
- Professional Associations