Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Life and Physical Sciences

In the box below, describe how this course meets the Foundational Component Area description for Life and Physical Sciences. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

ANSC 107 General Animal Science explores the basic biological principles of each livestock species by furthering the student’s understanding of topics such as anatomy, growth, genetic selection, environmental and human impacts on the production of livestock and food, meat science, animal health, reproductive physiology, and digestive physiology. Utilizing the scientific method, the fundamental science of each topic is developed within each species (beef cattle, dairy cattle, horses, poultry, swine, sheep and goats) in context with marketing and production forces. Gaining a thorough understanding of the animal sciences will help students analyze the livestock industry challenges and formulate responses. In response to these problem solving events, practical application and technological implementation is developed.

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

How Addressed
Students will develop critical thinking skills through synthesis of the information in relation to 1) the causes and effects of animal diseases, 2) reproductive difficulties, 3) nutritional requirements and 4) animal breeding (genetic selection).

Strategies
Each topic will begin with scientific background, followed by how this relates to environmental and/or biological effects, then practical applications. Examples would be:
Lectures on animal breeding would begin with the general facts about each of the physiological and behavioral characteristics about breeds. Sample topics would include maternal proclivity, rate of growth, degree of heat tolerance and immune resistance. Subsequent discussions and examinations would then utilize this information as a basis for analyzing which breed of animal would be best suited for a specific region with known conditions considering the given attributes of that breed. Further, the class would use the application of this foundational knowledge to innovate new breeds of animals in order to generate hybrid vigor and optimize animal performance. Another example lecture would be the presentation of basic endocrinological principles. As an example, students will be instructed on the basal mechanisms of hormone action as they relate to reproductive biology. The class would then be engaged in thought provoking scenarios that pose queries challenging the students to interpret scientific data (such as circulating hormone levels) for use in real world scenarios. An example, would be the question: “Progestosterone is present at a high level in the blood of a doe on day 31 post ovulation. Is she pregnant?” Students would then have to utilize the given information in the appropriate context in order to come to a scientifically
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

supported conclusion. Moreover, translational application of the course materials will also be integrated as the class will explore current reproductive technologies and develop strategies for potential manipulation of hormone cycles in livestock species. Students will be requested to provide innovative responses to the challenges and inquiries animal agriculture will face in the future. Another pillar of the course materials is a focus on nutritional biology. Specifically the nutritional value and purpose of a feedstuff will be presented, along with disorders and disfunctions associated with toxicities and deficiencies involved with each major nutritional requirement. Symptoms of abnormal activity would be revealed to the class, and the students would be expected to provide solutions to the problem after analyzing the animal’s diet. Students will also be given information regarding an animal’s stage of production and be prompted to provide the nutritional components of a diet, which would be most suitable during that phase. Additionally, the class would also analyze the physiological and environmental factors which influence, promote and inhibit animal growth and development. A general understanding of the interaction of breed physiology and behavior as influenced by genetotype, endocrinology, and nutrition will provide the class a basis of knowledge of the collective influences on animal production and performance.

How Evaluated
Scenarios will be presented or exams in order to test the extent to which each student understands and is able to apply the material presented in lecture, and subsequently generate at an appropriate solution for the query given. Scenarios presented will vary from production oriented to occupation specific (i.e. veterinarian, A.I. specialist, feedlot manager, etc.) as to encompass the breadth of information disseminated in the lectures.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

How Addressed
The course will have a note packet which will provide the students with all of the lecture presentations as well as supplemental pictures and labeled diagrams. Active learning is used in almost all lectures, which includes extensive question and answer dialogue with students during the class. Students will be asked critical thinking type questions throughout each lecture and will be expected to formulate a response (including both written and oral) to best describe how and why they would address the questions provided in their respective individual manners.

Strategies
Students are always prompted to ask questions and provide solutions to the questions asked during class. Students will be asked thought provoking, situation-type questions throughout each lecture in order to stimulate dialogue with the instructor during class. The class will also be asked random questions throughout lecture which will provide feedback on the level of understanding for the majority of the class while maintaining student interaction and classroom engagement. Another strategy that will be utilized to achieve communication in the class is “ask your neighbor time.” A question, statement or mechanistic principle will be provided to the class, and students will be allowed to converse with their neighbor in order to either dispute or agree on an answer or explanation. Individuals throughout the room will then be expected to provide their conclusion and be open for discussion based upon it. This strategy will be implemented to keep the class engaged throughout the lecture and will also provide the students an opportunity to demonstrate their mastery of the subject matter by teaching one another. In addition to “ask your neighbor time,” whole brain teaching methods will be applied. This strategy will enhance the visual communication amongst the class. For example, by connecting a specific term to a gesture, the class will be actively engaged in order to make the gesture each time the term is stated. To encourage further scientific knowledge and aptitude, students will be asked to do supplemental readings which will promote professional development as animal scientists. Students will utilize the American Journal of Animal Science’s free membership offer for undergraduate students where they will be able to access journal articles, symposia archives, and public policy documents (www.asas.org). Reports and group projects will be geared to the style and format of professional documents and presentations at ASAS venues. Students will also be required
Texas A&M University

Core Curriculum

Initial Request for a Course Addition to the Fall 2014 Core Curriculum

to complete journal or blog entries on the eCampus forum section in order to monitor the individual progress students are making with the material as well as each one’s advancement in communicative skills. In addition to these written and verbal components, the class will be expected to create a hormone flow chart demonstrating the cause and effect events of the endocrine system in the female. They will also be provided with different teaching aids such as equipment or preserved reproductive and digestive tracts in order to enhance the learning experience as the instructor traces the steps of embryo transfer and the process of digestion in a ruminant animal. Short video clips of production systems will allow students to take “virtual tours” of animal systems around the nation.

How Evaluated

Many of the conclusions reached in class will appear on an exam type material, and the student will be expected to provide the answer which was generated by classroom at the end of the discussion time. Students will also be evaluated on the professional content and format accuracy of each report. Students will also be asked to turn in a sheet of paper with their response before and after the discussion in order to record progressive changes in thought and level of development in the discussion. In addition, students will be required to complete journal or blog entries on the eCampus forum section in order to monitor the individual progress students are making with the material as well as each one’s advancement in communicating the material. Moreover, undergraduates will be evaluated based on their oral responses and written responses submitted on pop quizzes, tests or via eCampus.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

How Addressed

Each day professionals such as livestock managers, food processors, nutritionists, and veterinarians make decisions based upon numerical (census), financial, or physiological data; therefore, students must achieve the knowledge and level of understanding to make profitable and ethical decisions when they enter the professional workforce. Students will acquire the skills necessary to effectively analyze data and further develop an accurate conclusion based upon facts such as breeding evaluation data via utilization of EPDs, market classifications and grades as well as diagnostic assessment of hormone levels and nutrient content of a particular feedstuff.

Strategies

Lectures will include the analysis of numerical data sets which are in support of the understanding of a specific topic. Sample lectures would include:

Evaluation of Expected Progeny Differences (EPD’s) will allow for interpretation of the data for specific heritable traits as well as predictions of the best sire to use in a given scenario. Carcass data traits will be examined and conclusions will be drawn in relation to the current market trends. Marbling score in conjunction with yield grade are traits upon which the market commonly emphasizes. Value determining traits, such as these, will also be discussed along with the impact of changes to the product in those specific quantitative areas. Students will also be expected to describe the correlation of differing numerical traits and the price margins. Another lecture will cover the topic of nutrient requirements in livestock and analysis of feedstuffs. Students must process statistical information and come to an informed decision or solution as to what to feed in order to maximize profits. For example, the digestibility and passage rate of a particular feedstuff alludes to the quality of a feedstuff and affects the rate of growth or efficiency of the individual to which it was fed. The class will also decipher hormone levels in accordance with the established profiles of certain stages of development, leading to the control of physiological phenomena in livestock species. The class will also be expected to utilize such information in order to predict the effectiveness and method of hormonal manipulations for breeding purposes.

How Evaluated

Numerical data will be given on exams and quizzes along with a scenario or situation. The students will be evaluated based upon the correct interpretation of the data and rationale for the answer/solution provided.
Texas A&M University

Core Curriculum

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Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

How Addressed
The majority of the team work employed in this class is attributed to hands-on models, group interpretations, and peer explanation of a specific lecture topic.

Strategies
Lectures will present challenges to students’ full understanding of various topics in Animal Science and are designed in order to provoke thoughtful responses after peer collaboration. Examples include:
Formulating a report with viable solutions constituted by valid research and citations in response to “hot topics” facing animal agriculture. Creating a hormone flow chart that specifies the endocrine gland or cell where specific hormones are produced, upon what tissue targets the hormone acts, and the mechanism of regulation. Students are encouraged to make their own study materials and have them revised by peers. This ensures optimal achievement of comprehension for each student during their learning experience. Also, during the lecture over meiotic division and independent assortment, volunteers from the class are expected to pose as model pieces to the overall concept by acting as chromosomes and groups of cells. The same approach is used to further develop the understanding of hormone signals and regulation. Student volunteers act as a model of the female reproductive tract and communication system as they are assigned structures and specific hormones. Next, they are instructed to “send the appropriate signals” to achieve the desired event (ovulation, formation of a corpus luteum (CL), leutenization of the CL, etc.). The instructor will prompt the class to congregate into their teams which are divided by each row within the class and complete the bonus assignment. These assignments will be based off of a lecture topic and will probe the class to partake in activities such as drawing out and labeling a diagram, comparing and contrasting the benefits of a symbiotic relationship, and providing innovative solutions to problems an industry is facing.

How Evaluated
For some projects, the class will be evaluated as a whole based upon participation in class discussion. Other smaller and more deliberate projects, group members will submit a paragraph to eCampus along with the project describing the contribution level of each of the other members, giving them an overall teamwork score. In smaller class sections, the students will also be evaluated on the quality of the team’s flow charts in relevance to the grading rubric.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.