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.

How does the proposed course specifically address the Foundational Component Area definition above?

Unit 1 of the lecture part of the course examines the nature of faminies and malnutrition in the context of the quantitative past and future of human population growth at global and regional levels. Unit 2 describes the physiological processes of photosynthesis and photosynthe partitioning, the breeding techniques of selection and hybridization, and their relationship to high yield crop production to meet the needs of the growing human population. Unit 3 explains the major techniques, powers, and limitations of genetic engineering to enhance future crop production. Most of the labs are devoted to the Team Science Project comparing the seedling growth of crop species in pure and mixed cultures requiring students to conduct a valid experiment with replications, randomization, data collection, statistical analysis, data expression, interpretation, and presentation. One lab requires the dissection of crop seeds, vegetative growth, and flowers. Finally, other labs have simulation exercises of selection, hybridization, and the protein probe strategy to find a gene.

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.

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

Each exam requires the calculation and analysis of numerical/graphical data concerning population growth, crop growth, plant breeding, or gentic engineering. The Team Science Project requires the collection, analysis, and interpretation of data collected by each team from growing plants.

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

Three lecture exams require medium or long answer, including the construction and interpretation of numerical/graphical data. The Team Science Projects concludes in a poster presentation with tables, graphs, and words. Finally, each student must speak during an oral presentation of the poster to the lab instructor and class.

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

On exams students use demographic data to calculate the number of births, deaths, infant deaths, percent of infant deaths, and percent of all deaths due to infant deaths. They also calculate and interpret leaf area index, harvest index, means, and standard deviations. No devices are allowed to assist calculations on the exams. Excel is used to calculate and graph means and standard deviations of treatments in the Team Science Project.
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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):

Every lab project, especially the Team Science Project, involve students working in teams of two to four. They receive a team grade for these projects. These projects require cooperation in dissection, simulations, planting, fertilizing, watering, harvesting, bagging, weighing, data entry, calculations, graphing, interpretation and poster presentation. The professor-in-charge meets with each team individually to assist in the interpretation of the science project.

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