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?

**Biology 113/123 (Essentials of Biology and Essentials of Biology Lab)** is a one-semester survey of basic biological principles highlighting chemical basis of life, cell biology, bioenergetics, genetics, evolution, diversity, form/function, the interaction of organisms with their environment and how each of these impact the human experience. Course includes a weekly laboratory component that implements use of the scientific method to reinforce and provide supplemental information related to lecture topics.

**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):**

The scientific method is the fundamental basis of both lecture and lab. Lectures expose students to historical scientific experiments allowing them to hypothesize possible outcomes, reinterpret results, and explore alternative methodologies. Particular lecture topics (DNA profiles, cancer causes/treatments, Y-chromosome analysis, mitochondrial DNA interpretations) require students to examine, infer, compare, and contrast data. Lecture exams provide a variety of questions to assess students' ability for critical thinking, analysis, application, and synthesis of these course topics. The laboratory provides a hands-on, active learning approach with scientific method based exercises that support students developing their own hypotheses, and independently generating, analyzing, and interpreting data. Experimental conclusions are critiqued, evaluated and summarized in quizzes, homeworks and in-class assignments.

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

Students interpret laboratory experimental results in written in-class and homework assignments implementing graphs, tables, figures, and text. Lab introductions and summaries involve instructor/student interaction with examination and summarization of concepts through the vehicle of review questions. Labs conclude with with an instructor/student interactive summary during which students orally respond to and ask questions. Both lecture and lab utilize visual communication through interpretation and analysis of data presented in graphs, tables and figures.

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

All laboratory exercises involve the generation and/or manipulation and subsequent analysis of numerical data. These data are presented and summarized in tabular and/or graphic form for homeworks and in-class assignments and
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quizzes. Specific lecture topics, specifically biological chemistry, STR (short-tandem repeat) analysis, fossil dating, and genetics, also require students to manipulate and interpret numerical data. Students' aptitude in these practices are evaluated via computational problems on lecture exams, weekly lab quizzes and graded homework and in-class assignments.

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

The majority of laboratory exercises require students to work in groups (typically of four students). Different groups or members of each group typically perform separate components of the lab exercise; the groups or group-members then interact to produce a set of group-compiled results. Each student subsequently uses the group-compiled results as the basis for his/her written lab assignment (in-class or homework). Teamwork is assessed by direct observation by the lab instructor and the assignment of appropriate participation points. During interactive lab summaries and lecture discussions of specific experiments, students have the opportunity to consider different explanations of data and how these might yield different points of view. During lecture, students have the opportunity to interact with classmates to solve problems presented via a classroom interactive media mechanism. Students may discuss the problem, assist others with understanding the concept, and then independently infer and submit their answers electronically (via Top-Hat Monocle software).

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