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?

Soil Science, SCSC 301, describes and explains the natural phenomena of the nature and properties of soils. It uses these descriptions and explanations to predict soil formation and changes brought about to soils due to man’s manipulations and environmental conditions and changes. It is fundamental to Life and Physical Sciences because almost everything that we eat, drink, wear, and construct is either from the soil or on the soil. Soil Science advances the scientific principles of soil properties on the physical world and on human experiences over geologic and modern time. It develops additional language and facts of soils related to soils as a natural body having the combined effects of climate and biological activity, as modified by topography, acting on parent material over time. The learning objectives of this class include:

1. Describe and quantify fundamental soil physical, chemical, biological and mineralogical properties and the explanation of how these properties impact natural and agricultural ecosystems;
2. Describe and predict the formation of soils as they relate to their environment, their description, and their classification;
3. Define and describe the role of soils in infiltration, percolation, and storage of water;
4. Explain the role of macro- and micro-organisms in soil, their function and their requirements; and
5. Identify and describe of the biogeochemical cycles of soil-provided plant essentials nutrients.

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):

Basic concepts of soil science will be presented in lecture and demonstrated in the laboratory exercises. Students will utilize the basic concepts with creative thinking to make interpretations about different scenarios presented in lecture, laboratory, and the soil pit during the field trip. Students will use innovative and up to date technology, such as Web Soil Survey, to analyze, evaluate, and synthesize information to make interpretations about the potential uses of the site they collected their soil sample from that is used in the laboratory and the soil pit. Their critical thinking will be evaluated through exams and daily quizzes in lecture, weekly quizzes in lab, two written reports, one from the analysis and evaluation of the soil pit and one based upon their collected soil sample, and one oral report based upon their final soil sample report.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):
Texas A&M University
Core Curriculum

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

Students will be required to synthesize and interpret concepts presented in lecture and laboratory exercises and write two summary lab reports for grades. Visual evaluations and interpretations will be made on the field trip in the soil pit and surrounding landscape to make predictions of the suitability of the soil and site for structures such as buildings and roads, septic systems, and potential for growing different crops. These evaluations will be documented on a soil judging form and turned in for a grade. Additional visual interpretations will be made through experiments done by the student individually and in teams, and demonstrations in the lab. Knowledge gained from these interpretations will be tested through weekly lab quizzes. The lab report over their soil sample will be developed into an interpretive oral report that will be given during the last laboratory and will constitute their last lab grade.

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

Numerous calculations will be demonstrated and required for the students to make based upon data presented in lecture and in laboratory exercises. Examples of calculations are soil bulk density, particle density, total porosity, volumetric water content, nutrient concentrations in extracts, recommended nutrient rates of application based upon extractable nutrients and crop and yield goal, etc. Graphs are presented in laboratory and students must interpret data based upon the graphs, such as pH vs % Base Saturation. Data is presented and students must develop a graph to answer questions related to volumetric water content and plant available water.

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

There are several laboratory exercises where students will work in pairs to evaluate data. During the field trip, students will work in groups of 3 to 5 to evaluate the soil characteristics observed in the soil pit. This information will then be used to interpret potential uses for the soil. Types of evaluations will be road construction, suitability of the site for a conventional septic system, home construction site with or without a basement, potential for growing different crops and conservation measures that would need to be implemented. This exercise is one of the written reports.

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