

July 19, 2013

1. College: **Science and Mathematics**
2. Department: **Biology**
3. Course status: **existing; requires modification**
4. Course prefix and number: **BIO 131**
5. Course title: **Principles of Botany**
6. Course catalog description: **Introduction to the fundamental principles of botany and plant sciences. Topics include the study of plant form, function, reproduction, and an overview of plant diversity, including Bryophytes, ferns, and seed plants.**
7. Number of semester credit hours: **4**
8. Estimated total course enrollment per year: **400**
9. Course prerequisites and/or required qualifications for enrolling in the class: **TSI complete**
10. Course **is not/will not be** available online.
11. Foundational Component Area: **Life and Physical Sciences**
12. Explain why this course fits into this foundation component area: **Botany is the scientific study of plants. In this course students will be introduced to and follow the scientific method and evaluate hypotheses. They will learn plant structure and function and be able to make predictions based on these observations. In the capstone “Economic Botany” lab students will review past material as it pertains to plants that have important human impacts.**
13. Core Objectives
 - Critical Thinking - The scientific method itself is an exercise in critical thinking. Students will be instructed on the nature of science and the scientific method through a critical reading given during the first week of lecture. The reading details the nature of science, scientific method, and discusses science as a critical thinking method. Students will develop critical thinking skills by following the scientific method in laboratory exercises in which they will be asked to define a research question (inquiry), identify null and alternative hypotheses (logic), gather and analyze data, and determine which hypothesis receives the support of the data (evaluation and synthesis). Students will be formally instructed on critical thinking techniques by means of a required reading in their lab manual (week 2) including the importance of compare/contrast methods (evaluation of information), the identify/interpret skill (synthesis of information), and using data to draw conclusions. Many labs are structured in such a way as to help students develop these skills through scientific testing, by comparison and contrast and identify and interpret activities, and by drawing conclusions based on observations. While students will practice critical thinking and scientific method skills as part of most laboratory exercises, they will demonstrate their abilities in the Plant Ecology Poster assignment (weeks 12, 13, and 15) during which they will follow the scientific method by proposing and testing hypotheses, the support for which they will evaluate based on the data, and by drawing correct conclusions based on that data.
 - Communication Skills - • Communication Skills- Students will be instructed on the nature of science writing format (Title, Introduction, Materials and Methods,

Results, and Discussion) which is quite different from the standard essay format taught in other courses. Instruction will be delivered in the form of a critical reading incorporated in the Lab Manual and through discussion with the lab instructor during week 13. Week 13 critical readings and in-lab instructions will include how to properly prepare, incorporate, and display graphic results of data in a scientific poster (Visual Communication Skill). Students will demonstrate written and visual communication skills in a Plant Ecology Poster (weeks 13 & 15) by preparing a PowerPoint poster to include written paragraphs and incorporate graphic representation of results.

- Empirical and Quantitative Skills - • Empirical and Quantitative Skills- Data analysis is an important part of science. Student will receive instruction on how to make appropriate calculations and measurements (weeks 5 and 7) and how to analyze data using an Excel spreadsheet (Week 13) in addition to other explanations as required. Students will develop empirical and quantitative skills in several laboratory exercises. Required activities will include making proper measurements, performing calculations, and computing probabilities. Students will also gather data and draw conclusions based on that data. The Empirical and Quantitative skill includes the “manipulation” of “observable facts”. Students are instructed in the proper use of the microscope as a tool for observing details that cannot be seen with the unaided eye (Week 2). Microscope observation is fundamental to the course and is an integral part of most lab exercises. Students will demonstrate their empirical and quantitative skills in the Plant Ecology Poster project in which they will be required to make scientific measurements and observations (gather data) and analyze the data.
- Teamwork - • Teamwork- Students will work frequently in teams throughout the semester, but will do so formally during weeks 11-15. Students will be provided with written instructions detailing the elements of good teamwork as part of their Plant Ecology Poster project (week 12). The Plant Ecology Project is a team project that will require students to work in teams with the goal of dividing work equitably, gathering and analyzing data, drawing conclusions that harmonize differing points of view, and communicating findings. As part of the project, students will critique the teamwork experience with peer evaluations using a multiple choice Likert Scale Questionnaire, and the teamwork experience as a whole by responding to short answer questions (due week 15).

Contact person for questions about this submission:

- a. Donald Pratt
- b. 2038

prattdb@sfasu.edu