September 5, 2013

1. College: Sciences and Mathematics

2. Department: Biology

3. Course Status: Existing; requires modification

4. Course Prefix and Number: BIO 225

5. Course Title: Local Flora or Fauna

6. Course catalog description: Field studies of local plants, animals, or fungi and their native habitats. Different offerings of the course will emphasize different organismal groups, e.g., plants, birds, reptiles, amphibians, arthropods, mammals, fish, or fungi. Required lab fee.

7. Number of semester credit hours: 3

8. Estimated enrollment per year: 60 (at four offerings per year)

Enrollment for individual sections will be somewhat small at 15 students per laboratory section offered. This is because of transportation limitations on the field trips and the fact that it is difficult to competently work with more than 15 students at a time in a field environment. It is anticipated that this course could become a popular option for students desiring an alternative environment in which to earn a 3-credit science core requirement. If so, additional laboratory sections will be added to accommodate the demand.

9. Course prerequisites: TSI complete

10. Course is not available online

11. Foundational Component Area: Life and Physical Sciences

12. Explain why this course fits into this foundation component area:

Biology 225 is an introduction to the diversity, ecology, evolutionary biology, and importance of selected organisms inhabiting the East Texas Pineywoods ecoregion. It consists of closely integrated lectures and laboratories in which students develop familiarity with local biota by emphasizing field trips to various area habitats. In so doing, students will learn to recognize and describe habitat types, explain their similarities and differences, and predict the types of organisms they harbor. By focusing on communities of organisms, students will gain an understanding of fundamental concepts regarding interactions between organisms, between organisms and the physical world, and between organisms and mankind. The latter will include impacts of selected organisms on agriculture, forestry, fisheries, human health, conservation,

and/or recreation. The scientific method will provide a guiding context for course activities which will include: 1) discovery, description, and comparisons of organisms in their natural habitats and in the lab (inquiry, data collection, empiricism); 2) generating explanations for documented patterns (hypothesis building); 3) forming predictions about the distributions of organisms based on student-generated hypotheses (hypothesis testing); and 4) dissemination of findings in multiple formats (communication).

13. Core Objectives:

Critical Thinking – Students will develop critical thinking skills through lectures, readings, laboratory exercises, and field trips emphasizing the following topics. See also syllabus assignments 1 and 2 for specific examples of activities that develop critical thinking.

1. Systematics, Taxonomy, and the Scientific Method. Students will develop an understanding of the scientific method within the context of the practice of biological classification. They will learn fundamental concepts regarding how organisms are named and assigned to categories and how these actions represent hypotheses that can be tested. Furthermore, they will discover how hypotheses of evolutionary relationship are generated and visually expressed using evolutionary tree diagrams. These topics will be introduced with lectures and reinforced with readings and lab activities. In the latter, students will devise their own classifications and evolutionary trees, activities which require thoughtful observation (CO 3), application of the logic involved in assigning organisms to hierarchical categories (CO 1), and an understanding of hypotheses and associated information can be contained in visual diagrams (CO 1, 2). **Lab Assignment 1-Organizing the diversity of life-** will be used to help develop these skills:Student teams will devise a classification system and phylogeny for a provided group of preserved or model organisms as an aid to developing teamwork, empirical skills and critical thinking.

2. Identifications of organisms. Students will learn to recognize selected organisms and natural habitats of East Texas. Concepts will be introduced in lectures and skills will be further developed through lab activities, field trips, and activities emphasizing the use of dichotomous keys. Successful outcomes using keys requires cooperation (CO 4); a command of specialized vocabulary (CO 1); an understanding of anatomy (CO 1); skill in taking, storing and summarizing measurements (CO3); and thoughtful, precise decision making (CO1). **Lab Assignment 2** where student teams perform identifications using dichotomous keys (critical thinking, empirical and quantitative skills, and teamwork) will be used to help develop these skills in addition to weekly field quizzes.

Communication Skills – The importance of communication in science will be emphasized by exposure to topics such as primary literature, peer review, academic conferences, and scientific illustration. Students will demonstrate written and visual communication skills by keeping a field notebook, performing at least one writing assignment, and preparing a photographic portfolio of

habitats and organisms encountered on field trips. The systematics and taxonomy section will also develop visual communication in the context of evolutionary trees (see above). See syllabus assignments 1, 3, & 4 for specific examples of how communication will be developed. Aspects of oral communication may be covered in lecture but will not be specifically addressed through assignments. **Lecture Assignment 1,** a writing assignment where students investigate a group of organisms or a habitat in a short literature-review paper will help develop written communication skills and **lab Assignment 3,** a photographic portfolio of organisms and habitats introduced during the course will help develop visual communication skills.

Empirical and Quantitative Skills – Data collection and analysis are crucial parts of science. Students will be required to gather and analyze data and draw conclusions at various points in this course. These skills will be developed through lectures, lab activities, and field trips. Successful identification of organisms often demands proper use of equipment and accurate measurements of biological structures (see syllabus assignment 2) and environmental parameters. Students will learn how to record, store, and express structural and environmental data using equipment such as microscopes, calipers, ocular micrometers etc. Methods of data storage and summarization using graphs and summary statistics will be by treated. **Lab Assignment 2,** where student teams perform identifications using dichotomous keys (or other scientific identification) will help develop quantitative and empirical skills as they make the necessary measurements (in addition to teamwork skills).

Teamwork - Students will be required to work in teams at various points in the course; related skills will be developed during lab activities and field trips. Making identifications with dichotomous keys will be done in pairs. Students will be required to come to a consensus when disagreements and conflict arise over identifications. 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. Students will learn how to effectively and safely conduct fieldwork, one aspect of which is working in groups. Tasks will be divided between individuals and activities may be evaluated based on outcomes of the entire group. See syllabus assignments 1 and 2 for specific examples of how teamwork will be developed in this course. **Lab Assignment 2,** where student teams perform identifications using dichotomous keys will help develop teamwork skills (in addition to critical thinking, empirical and quantitative skills).