Local Flora or Fauna
Biology 225

Course 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.

Pre-requisites: TSI complete

Text and Materials: Varies with instructor. Includes relevant field guides and/ or identification manuals such as the following:

Tveten, G. 1997. Wildflowers of Houston and Southeast Texas.

Marshall, S. 2006. Insects: Their Natural History and Diversity, with a Photographic Guide to Insects of Eastern North America.

Course Approach: 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 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 (inquiry, empirical and quantitative methods); 2) generating explanations for documented patterns (hypothesis building); 3) forming predictions about the distributions of organisms (hypothesis testing); and 4) dissemination of findings in multiple formats (communication).

Course Requirements will vary with instructor but will include exams, written assignments, and laboratory exercises and projects (see assignments 1–4 below).

Grading Policy: A standard grading scale will used (A = 100–90%; B = 89–80%; C = 79–70%; D = 69–60%; F < 60%).

Attendance Policy: Good attendance is crucial to doing well in this class. Specific policies and procedures regarding absences will vary with instructor.

Student Learning Outcomes (SLOs):

SLO 1. Become able to identify and describe local natural habitat types within the East Texas Pineywoods ecoregion.

SLO 2. Become able to use technical keys and scientific field guides to identify organisms on the basis of measurements and observations using appropriate equipment.
SLO 3. Become able to communicate the ecosystem roles of selected organisms and their significance to mankind in written form.
SLO 4. Develop an understanding of the relationship between form and function.
SLO 5. Become acquainted with current approaches to biological classification and the major lineages of the organisms covered and able to express this understanding in written and visual form.
SLO 6. Become familiar with methods of biological collections and their importance to society.
SLO 7. Become able to understand and generate graphs, charts, summary statistics, and/or scientific illustrations.
SLO 8. Develop teamwork skills by working in groups to complete lab exercises, conduct fieldwork, make identifications, and resolve differences.

Departmental Program Learning Objectives:
This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.

General Education Core Course Objectives (COs):
CO 1. Critical thinking: to including creative thinking, innovation, inquiry, and analysis, evaluation, and synthesis of information. (SLOs 1–7)
CO 2. Communication skills: to include effective development, interpretation, and expression of ideas through written and visual communication. (SLOs 3, 5, 7)
CO 3. Empirical and quantitative skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions. (SLOs 2, 4, 7)
CO 4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal. (SLO 8)

Academic Integrity (*A-9.1*): Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

<u>Definition of Academic Dishonesty</u>
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism.
Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades *Semester Grades Policy (A-54)*: Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

Students with Disabilities: To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

COURSE TOPICS

Topics listed will be covered in all sections except where stated otherwise (*).

I. LECTURE

A) Introduction (5%)

- East Texas and the Pineywoods ecoregion

B) Systematics and taxonomy (20%)

- **CO 1–4:** Lectures, readings, and exercises will develop critical thinking, empirical skills, teamwork, and visual communication.
- Biological classification: common names, scientific names, higher level categories
- Lineages, phylogenies/evolutionary trees
- **Teamwork, empirical skills and critical thinking assignment** (See lab Assignment 1- Organizing the diversity of life). Student teams will devise and critique a classification system and phylogeny for a provided group of preserved or model organisms.
- **Critical thinking, empirical and quantitative skills, and teamwork assignment** (See lab Assignment 2). Student teams will perform identifications using dichotomous keys or other scientific identification tools.

C) Scientific communication (5%)

- **CO 2, 3:** Assignments, exercises, and projects will develop communication and empirical and quantitative skills.
- Terminology for biological structures
- Descriptive statistics
- Scientific literature, diagnostic keys, field guides, peer review
- **Written communication assignment (Lecture Assignment 1).** Students will investigate a group of organisms and/or a local habitat in a short literature-review paper.
- **Visual communication assignment (See lab Assignment 4).** Students will prepare a photographic portfolio of the organisms and habitats introduced during the course.
- **Lecture Test 1.**

D) Biological collections (10%)

- Importance to society: research collections, teaching collections, public displays
- Preservation and archival techniques
- Tour of SFA natural history collections

E) Natural & semi-natural East Texas Ecosystems (20%)

*The actual ecosystems covered will vary depending on the organisms emphasized in the particular offering. Ecosystems that may be covered include:

- Sandy dry uplands

- Longleaf pine woodlands
- Herbaceous seeps
- Loamy dry-mesic mixed uplands
- Mesic lower slopes & stream bottoms
- Forested Seeps
- Irregularly flooded wet-mesic stream bottoms
- Seasonally-flooded river floodplains
- Regularly-flooded swamps
- Semi-permanently flooded swamps & marshes
- Roadsides, fields, & other human-dominated ecosystems
- Aquatic ecosystems
- **Lecture Test 2**

F) * Selected groups of East Texas plants, animals, or fungi (varies per instructor) (40%)

- **Lecture test 3 and Final examination**

II. Laboratory

A) Systematics and taxonomy introduction (5%)

- **CO 1–4:**
- **Teamwork, empirical skills and critical thinking assignment** (Lab Assignment 1-Organizing the diversity of life). Student teams will devise and critique a classification system and phylogeny for a provided group of preserved or model organisms.

B) Organism identifications (25%)

- **CO 1–4:**
- **Critical thinking, empirical and quantitative skills, and teamwork assignment** (Lab Assignment 2). Student teams will perform identifications using dichotomous keys or other scientific identification tools.

C) Field trips to document, describe, and/or sample native species in their habitats (70%)

- **CO 2:**
- **Visual communication assignment** (Lab Assignment 4). Students will prepare a photographic portfolio of the organisms and habitats introduced during the course.
- **Weekly field quizzes** focusing on identification and ecology of assigned organisms.

Selected Topics, Assignments, and Activities that Develop Course Objectives and Student Outcomes

I. Systematics, Taxonomy, and the Scientific Method

- **CO 1–4:** critical thinking, empirical skills, teamwork, visual communication

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, 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: scientific method, classifications & phylogenies

Students will be presented with an array of preserved organisms (plants, shells, pinned insects, etc.) or models of hypothetical organisms such as *Caminalcules* (a play on "animalcules," [Latin for "small animal"]), which are hypothetical creatures invented by the late Professor Joseph Camin as a means of instructing students on basic concepts of biological classification and evolutionary diversification. Working in teams (CO 4), students will be required to devise names, group individuals in a hierarchical classification (CO 1), and present an evolutionary tree that visually communicates hypotheses of evolutionary relationships (CO 2). Students will be required to justify their classifications (CO 1, 2), defend their hypotheses (CO 1, 2), and test them with new data (discovery of a fossil and/or new species) (CO 1). Successful completion of activities will demonstrate an understanding of concepts regarding evolutionary trees, biological classification, and crucial aspects of the scientific method including distinctions between observation, question, fact, hypothesis, hypothesis test, and conclusion.

II. Identification of Organisms

- **CO 1–4:** critical thinking, empirical and quantitative skills, visual communication, teamwork

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: Identifications using dichotomous keys
Working in teams, students will compete to identify unknown organisms using technical, dichotomous keys (or other standard scientific identification tools) and in so doing demonstrate an understanding of the hierarchical nature of classification, specialized terminology, and anatomy (CO 1). Team members will be required to submit the same answers, thus students will have to resolve differences of opinion (CO 4). Students will correct misidentifications and document how locating mistakes in an identification pathway results in learning (CO 1). Various measurements will be recorded, tabulated, and summarized using appropriate statistics and/or graphs (CO3).

III. Scientific Communication

- **CO 2:** Written and visual communication

The ways in which scientists communicate will be emphasized by exposure to topics such as primary literature, peer review, academic conferences, and scientific illustration (CO 2). Students will demonstrate communication skills by keeping a field notebook, performing at least one writing assignment, and a preparing a photographic portfolio of habitats and organisms encountered on field trips (CO2).

Lecture Assignment 1: Writing assignment
Students will prepare an article on a selected habitat, organism, or higher-level taxon that demonstrates exploration of the scientific literature, communication abilities, and appropriate use of grammar, style and terminology.

Lab Assignment 3: Photographic portfolio
Students will prepare a photographic portfolio of habitats, selected organisms, and their diagnostic structures. Images will be accompanied by appropriate labels and descriptions that demonstrate an understanding of terminology, anatomy, and conventions of scientific illustration.