

ISCI 3103: Natural History for Middle School Teachers Fall 2011  
Department of Biology, College of Arts & Sciences, Valdosta State University

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Office Hours: Tues & Thurs 9:15-10:00 or By Appointment. Please feel free to call the office or use email to schedule a convenient time. Anytime I am in my office, you are welcome to stop in to ask quick questions.

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Textbooks:

Natural Environments of Georgia

## SCI 3103 – Course Design: Guidelines for Content & Evaluation

### Enduring Understanding:

The natural world includes the totality of the physical and biological factors that have and continue to influence the evolution of living organisms.

### Essential Questions:

What characterizes the systematic aspects of human investigations of the natural world?

How does the Theory of Evolution explain the history of life?

How have significant features of physiogeography of Georgia influenced the vast biodiversity of the state?

How does Inquiry-Oriented, Activity-Based pedagogy influence the teaching and learning of Life Science?

### Basic Knowledge & Skills Students Will Acquire:

The Nature of Science as both a Body of Knowledge and Set of Processes

Principles of Ecology

Evolutionary History of Living Organisms

Essential Subject Matter Covered in the 7<sup>th</sup> Grade Life Science Section of the GPS

Techniques & Standards for Field Study of Living Organisms

Strategies for Teaching 7<sup>th</sup> Grade Life Science Based on the Georgia Performance Standards

### Students in ISCI 3103 will be expected to:

- I. Display a collection of information documenting personal growth through course experiences.
- II. Describe the evolutionary processes responsible for biodiversity and explain the characteristics of major Taxa.
- III. Compare and contrast how the abiotic factors influence the biotic features of major ecosystems in Georgia.
- IV. Characterize the Nature of Science.
- V. Indicate the possession of conceptual understanding of the Nature of Science & the Life Science GPS.

### Proof of mastery for each will be demonstrated by the knowledge & skill shown in:

- I. Writing & Other Assignments – A summative, comprehensive evaluation of Pedagogical Content Knowledge in Life Science
- II. Ecosystem Report – Scientific poster projects and oral presentation prepared individually and shared in interactive session
- III. Midterm & Final Exams - Based on Labs, Lectures, Discussions, Field Trips, & Books

### The following facets of understanding will be built into the course assessments:

Explanation – Description of subject matter and pedagogical practices

Interpretation – Demonstration of astute reasoning and ability to make meaningful connections between concepts

Application – Explanation of the links between subject matter and science instruction

Perspective – Identification of the nature of science in our formulation of an understanding of the natural world

Empathy – Indication of the recognition of the value and need to provide quality education in Middle Grades Science

Self-Knowledge – Illustration of personal reflection on the process of learning and teaching science



## Course Assessment:

Course Assignments	20%
Ecosystem Project	10%
Class Participation & Reflective Record	10%
Department & Attendance	10%
3 Midterms (10% Each)	30%
Final Exam	20%

**Work Ethic:** This course has an accurate reputation for being "a lot of work." Effort will be rewarded by gains in understanding of scientific information and good grades. Success depends on consistent attention to the assignments and hard work. Grades are based on the quality of the product produced, not the time spent on assignments. The only students who ever fail this course are those who do not do the work and have a bad attitude!

**Short Assignments:** It is too easy to attend class on a regular basis, but put little thought into the course material until there is pressure to study for an exam. Regular short assignments will give you an idea of the course expectations and mandate regular attention to the material that is being covered. These assignments will be described in class and are due at the start of class or lab. These will be graded on a 10 point scale as follows: (10=Excellent, 8=Good, 6=Adequate/Minimal, Anything less must be resubmitted). Deadlines are firm because there are 50 students in the class. Papers will be graded down 10% if they are turned in after class, and reduced by another 10% for every additional day they are late.

**Ecosystem Research Reports:** Each person will select a different topic to serve as the focus of an investigation that will be conducted throughout the semester and presented as a printed poster and in a group final report during the last week of class. Everyone will be given their choice of topics for these assignments, but you must be able to visit your area at least once during the semester or have been there before enough to know what the place is like. When you decide what interests you, please send me an email with a sequential list that ranks your top 5 choices. People that select the far North and those with transportation issues should contact me early. Otherwise, the order in which I receive your emails in my Inbox will be used to prioritize requests. I will start with your first choice and go down your list until I find the first unclaimed topic. These projects will be done in stages that involve gathering preliminary information in short assignments that will be combined for the presentation.

**Attendance:** Since about half of this course involves active experiences in the field and in the laboratory, it is not possible to "make-up" missed material. Three late arrivals to class will be counted as an unexcused absence. ALL other class absences must be made up by writing a research paper on the class lecture topic that uses no less than 2 outside published sources (i.e. not your text) and is 1 full single-spaced page (10-12 point type, 1" margins) and at least 500 words in length. Failure to submit these make-up papers to the instructor within 1 week of the absence, will impact the grade for the course. Anyone who misses more than 20% of the class sessions can receive a failing grade for the course.

Class P

## Class Participation Grade

This dimension of the course purposely gives you flexibility and choice about what you do for part of your grade. Each of these and other approved activities will count for a certain number of points. At the end of the semester, the points accumulated by all of the students will be averaged. The class average will be 100%. Anyone who earns more than the class average will accrue extra credit. Anything below the class average will be calculated as a percentage of that. You should plan ahead and do as much as possible early in the semester. Everything you do for participation should be documented in a Reflection Book that also includes your lab write-ups.

There are two weeks that we will have one extended field trip and lecture will be combined with the lab so that we can get away from the university from 10:00-3:15. Each of these will be worth multiple participation points. The first is a teaching experience that takes place right after Fall Break on Thursday, Oct. 18th at Pine Grove Outdoor School. The entire 3rd grade class is meeting us for hike. In pairs that I designate, two of you will take 6-8 of them on a tour of habitats. You can prepare by studying up on: Cypress Ponds, Freshwater Lakes, Blackwater Rivers (the Withlacoochee), Swamps, Floodplains, Upland Forests, & Pine Plantations. The second opportunity is on Tuesday, November 20<sup>th</sup> when we will go out to VSU's Lake Louise Field Station and do an extensive study of the community that is exposed of several ecosystems including: a lake, a swamp, and several types of forests. You are going to be responsible for knowing the ecology of these 2 places whether or not you go, but you can get the information from the students who do attend.

Attending Projects WET, WILD, and Learning Tree (TBA) will each count for 5 participation points. You must register ahead for each one. The books cost \$15-20, but you do not have to purchase them to earn the points. You can add 1-2 points to each workshop by researching the subject matter and the history and combining this with an analysis of how the curriculum supports the 7th grade standards in any subject area.

Our class probably will be taking a trip to Sapelo Island. This trip will be worth 25 participation points as long as you are positive and contribute to the experience. Anyone who acts wrong and tries to spoil the trip for others will get no points. If you can't attend the Sapelo Trip, you can do a research paper that will make up the same participation points if it is well enough done. This would be no less than 3 pages of text and a photoessay from the web.

The College of Arts & Sciences Seminars will count for 1 or 2 points. One point for attending as long as you fill out the evaluation sheet and leave it with the Biology professor in charge. They will place your evaluations in my mailbox. You can earn a second point by writing up a 300 word synopsis that includes information from 2 Web sources and relates to the scientific content of the presentation. The seminar schedule can be found at: <http://www.valdosta.edu/cas/scisem/Fall2012.shtml>

Trips to other natural sites, parks, aquaria, or natural history museums in Georgia or North Florida will also count as participation experiences. You must arrange credit in advance by writing up what you plan to do and how you will document with photography and writing what you learn on your visit.

Destinations: Okefenokee Swamp, Any Barrier Island

University Exhibits: UGA, UF, FSU Museums

Coastal Areas: UGA Marine Education Center (Savannah), Any Estuary Area

Natural History Museums: Fernbank in Atlanta, GA Natural History at UGA, Natural History at Georgia College in Milledgeville

Aquaria: Atlanta, Flint River (Albany)

Parks: Amicolola Falls, Stone Mountain, Unicoi, Providence Canyon, Cloudland Canyon, Tallulah Gorge, etc

Springs: Indian, Magnolia, Warm, Sandy, Radium

Geological Sites



## Class Field Trips

For some of the laboratory sessions, the class will visit a local site for an informal field science experience. You will be told in advance whether to meet at the site or travel with the class in a convoy. When a van is available, the van will leave promptly around 9:45 from the north door of the BSC. Meet outside of my office.

## Local Sites

## 7th Grade GPS Life Science Curriculum

Seventh grade students keep records of their observations and use those records to analyze the data they collect. They observe and use observations to explain diversity of living organisms and how the organisms are classified. They use different models to represent systems such as cells, tissues, and organs. They use what they know about ecosystems to explain the cycling of matter and energy. They use the concepts of natural selection and fossil evidence in explanations. Seventh graders write instructions, describe observations, and show information in graphical form. When analyzing the data they collect, seventh graders can recognize relationships in simple charts and graphs and find more than one way to interpret their findings. The students replicate investigations and compare results to find similarities and differences. The middle school life science course is designed to give students the necessary skills for a smooth transition from elementary life science standards to high school biology standards. The purpose is to give all students an overview of common strands in life science including, but not limited to, diversity of living organisms, structure and function of cells, heredity, ecosystems, and biological evolution.

Co-Requisite – Characteristics of Science Habits of Mind

S7CS1. Students will explore of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

- a. Understand the importance of—and keep—honest, clear, and accurate records in science.
- b. Understand t



#### Reading Standard Comment

After the elementary years, students are seriously engaged in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal learning. Students encounter a variety of informational as well as fictional texts, and they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas *in context*. Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects. Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

S7CS10. Students will enhance reading in all curriculum areas by:

a. Reading in All Curriculum Areas

- Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas
- Read both informational and fictional texts in a variety of genres and modes of discourse
- Read technical texts related to various subject areas

b. Discussing books

- Discuss messages and themes from a

# Georgia Ecosystem Project

## Terrestrial

1. Blue Ridge Mountains
2. Appalachian Highlands
3. Bluff & Ravine Regions
4. Great Valley Forests
5. Grass/Herb Balds
6. Pine Flatwoods
7. Oak-Hickory Climax Forests
8. Mixed Pine-Hardwoods
9. Piedmont Province
10. Coastal Plains Region
11. Longleaf Pine Savannas

## Wetlands

1. Cypress Swamps
2. Bay/Gum Swamps
3. Hammocks
4. Pocosin - Shrub/Forest Bogs
5. Herb Bogs
6. Flood Plains
7. Carolina Bays
8. River Marshes
9. Freshwater Marshes
10. Canebrakes
11. Salt Marshes

## Aquatic

1. Mountain Streams
2. Mountain Rivers
3. Alluvial Rivers
4. Blackwater Rivers
5. Mountain & Piedmont Springs
6. Coastal Plains Springs
7. Limesink Depressions
8. Backwater Streams
9. Natural Lakes
10. Cypress Ponds
11. Sag & Gum Ponds

## Coastal

1. Estuary/Sound
2. River Delta
3. Barrier Islands
4. Tidal Creeks & Rivers
5. Oyster Reef
6. Maritime Oak Forests
7. Dune Areas
8. Intertidal Beach Zones
9. Sponge & Coral Reefs
10. Ocean Benthos
11. Open Ocean

## Abiotic Factors

Location  
 Physiography  
 Substrate  
 Elevation  
 Climate  
 Seasonal Variation  
 Surrounding Ecosystems

## Biota

Producers  
 Consumers  
 Decomposers  
 Symbiotic Associations  
 Endangered Species

## Human Impacts

Habitat Destruction  
 Pollution  
 Usage

## Project Deadlines

8/21/12 - Topic Choice  
 8/28/12 -