ISCI 3103: Natural History for Middle School Teachers - Fall 2015

Department of Biology, College of Arts & Sciences, Valdosta State University

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Office Hours: Tues & Thurs 2:00-3:00 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.

Required Platforms:

LMS=Blazeview: Learning Management System - Your VSU Account. This will be used for all class communication, listing your assignments, and access to various resources. Be sure to check it for details of where the Tuesday lab will be and if it is not posted by Sunday – remind me in my VSU email. **(http://www.valdosta.edu/academics/elearning/blazeview-d2l.php) Free**

CMS=Connect: Course Management System - McGraw Hill Connect Version of ***Concepts of Biology***, Sylvia Mader, 3rd Ed.. This is a complete electronic version of the book and a versatile software product that will be the basis for most of your assignments. Log into Connect and there will be instructions on how to purchase the product. To save money, you will purchase this directly from the publisher at a Web address you will be given in class on Tuesday. **(http://connect.mheducation.com/class/l-jones-fall-2015)** $85.00. After you purchase the product, you can purchase a printed version of the text for $15.00 directly from the publisher.

Other Reading: Every Biology textbook contains the same scientific information and usually the chapters are in the same order. Each author tells the story differently, and you may find the voice of and presentation by one author more effective than another. In short, you can use other textbooks to supplement your experience and ensure that you thoroughly understand the concepts covered in this course. Open Stax Concepts of biology is free online (https://openstaxcollege.org/textbooks/concepts-of-biology)

Pedagogical Philosophy: This class will bridge the gulf between scientific and educational disciplinary training by allowing future teachers to learn new scientific information through a variety of instructional strategies. The course has been designed to model methods that enact the rhetoric of the science education reform movement. This nontraditional approach to college science is structured to help prospective middle school teachers make connections between methods of teaching and the process of learning science.

Course Description: Natural History is the study of the relationships between living organisms and how they interact with, influence, and are influenced by their natural surroundings. According to the VSU Undergraduate Course Catalog, *Science 3103* is a "survey primarily of the biota of south Georgia and associated biological processes. Using the biota of southern Georgia as a model, students will study basic ecological principles, population structure and dynamics, life history patterns, and reproductive strategies and behaviors common to living systems. Special topics covered in the course include the biology of rare and endangered species and the importance of biological resources to human society."

Course Content: The scientific subject matter aligns with the *New Generation Science Standards* which are the national framework for K-12 Science Education. The Georgia Performance Standards will be discussed and there will be deliberate coaching as preparation for the GACE Science Exams. Reflections on Teaching & Learning will be a regular feature.

Learning Objectives: In the ***Nature of Science*** module at the start of the course, *Integrated Science 3103* addresses the VSU General Education Outcome that specifies "students will demonstrate knowledge of scientific and mathematical principles and proficiency in laboratory practices." In the ***Ecology*** & ***Evolution*** modules, emphasis is on the Biology Departmental outcomes that call for the ability to "interpret ecological data pertaining to the behavior of the individual organism in its natural environment; to the structure and function of populations, communities, and ecosystems" and to "describe the evolutionary processes responsible for biological diversity."

Academic Honesty: Members of the class are expected to maintain high standards of integrity. This course will use the VSU Handbook Code of Ethics as a basic standard of behavior, and everyone in the class is required to read the Biology Department Plagiarism Policy sign a statement verifying that these guidelines are understood. Evidence of dishonest conduct or cheating will result in no credit for the assignment and depending on the case, a grade of "F" for the course.

Never copy text from a book or website and always cite sources unless it is very general or commonly known scientific information. Do not share your work with other students because both people will be held responsible. When students work together on projects or assignments, each person is responsible for submitting completely individual, distinctly different products. Do not expect lenience for claims that on the grounds of not knowing better. You will be reported to the Dean of Students and employers such as school systems do call that office at VSU to check on whether you have a record of infractions.

Special Services: Students requiring classroom accommodations or modifications because of a documented disability should discuss this need with me at the beginning of the semester. Register with the Access Office, Farber Hall, 245-2498.

Family Educational Rights & Privacy Act: Grades cannot and will not be posted by Name, Social Security Number, or other Personal Identifiers. Grades and student work will not be given over the telephone, by email or to another student.

SCI 3103 – Course Design: Guidelines for Content & Evaluation

Enduring Understanding:

Science is the systematic study of the natural world which includes the totality of the physical and biological factors that have and continue to influence the evolution of living organisms.

Essential Questions:

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
Biodiversity: Taxonomic Classification, Functional Roles, & Patterns of Interaction
Evolutionary History of Living Organisms
Essential Subject Matter Covered in the 7th Grade Life Science Section of the GPS
Techniques & Standards for Field Study of Living Organisms
Strategies for Teaching 7th 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 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 a community of ecosystems in Georgia.

IV. Characterize environmental issues in Georgia, with emphasis on land preservation & loss of biodiversity.

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. Course Portfolio – A summative, comprehensive evaluation of Pedagogical Content Knowledge

II. Biodiversity Project – Conceptual presentation of evolution & the phylogenetic classification of organisms

III. Sapelo Island Report – Visual & Narrative summary of Barrier Island Ecology

IV. Oral Presentations on Environmental Impact of Human Activity- PowerPoint research reports

V. Midterm & Final Exams - Based on labs, Field Trips, Books, & Trips

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 sustain state environmental resources
Self-Knowledge – Illustration of personal reflection on the process of learning and teaching science

ISCI - Tentative Course Schedule and Plan for Instruction

Dates & Topics	Assignments
The Natural World	
1. The Natural World	
Aug 18L – Introduction, Patterns in Nature	
18 - Levels of Organization	
20 – Course Description	Alphabetical Hierarchies
2. Life & the Living World	
25L – Abiotic & Biotic, Observation & Measurement	Register for Connect
25 – *LearnSmart* Learning	
27 - Life	LS Chapter 1
3. Scientific Processes & Reasoning	3E on the Natural World over 2 Weeks, Extension = Photo Collage
Sept 1L – Balance, Pennies, & Glass Beads	Mythos & Logos Paper & Survey Due 9/3
1 – History of Science	Read Chapter 16.4 & 16.5
3- Classification	
4. The Nature of Science	3E Extension = Relate to GPS for Characteristics of Science
8L – Prep for Field Labs & Demonstrations	
8- Nature of Science Unit Test	**Portfolio Due for Initial Assessment**
10- Test Review & **Biodiversity Assignment**	
The Revelations of Ecology	Extensions All Relate to the 7th Grade Content GPS
5. Global & Local Patterns	
15L – Pine Grove Trip - Compare Abiotic Factors of Ecoregions	LS Chapter 40
15 - Field Lab	
17 – The Natural History of Georgia	
6. Biogeochemical Cycling & Energy Flow	LS Chapter 39
22L – Lake Louise Trip – 3 Ecosystems in 1 Community	
22 - Field Lab	
24 – Nutrient Cycling, Energy Transfer	
7. Population Dynamics	LS Chapter 38
29L – Langdale Park – Plants & Populations	
29 – Field Lab	
Oct 1 – Populations & Behavior	**Biodiversity Assignment Due**
Sapelo Island Trip (Friday, Oct 2- 8:30am – Sunday, Oct 4- 8:00pm)	**Cost $110: $25 deposit due Sept 22**
8. Interdependence	LS Chapter 37
6L – Grand Bay – Animals & Water Quality	
6 - Field Lab	
8 – Coexistence & Symbiosis	Ecology Practice Activity Due 10/9
Oct 8th = Midterm	
9. The Revelations of Ecology	
13 - NO CLASS FALL BREAK	Ecology Pretest 10/14
15- Ecology Unit Test	**Portfolios Due for Formative Assessment**
The Theory of Evolution	**(Tentative Plan)**
10. The Evolution/Creationism Controversy	
20L – Mosaics	
20 – Myths & Truths about Evolution	
22 – The Social Controversy	
11. Evidence for Evolution	
27 L– Animal Skulls	LS Chapter 14
27 – Evidence for Evolution	
29 – Types of Evolution & Origin of Life	
12. History of Life	
Nov 3L – Biodiversity Lab	LS Chapter 16
3- Common Ancestry & Systematics	
5-	
13. Human Evolution	
10L – Primate & Human Skull Lab	LS Chapter 21
10 – Primate Characteristics	
12 - Hominins	
14. Artificial & Natural Selection	
17L – Live Fish Lab	LS Chapter 15
17 – Artificial & Natural Selection	
19 - Speciation	Evolution Practice Due 11/21
15. The Theory of Evolution	
24L – History of Evolutionary Thinking	
24 – Evolution Unit Test	Evolution Pretest Due 11/23
26- **No Class - Thanksgiving**	
16. Human Impact & Responsibility	
Dec 1L – Environmental Issue Presentations	
1 – Environmental Issue Presentations	
3 - The GPS for 7th Grade Life Science	
Comprehensive FINAL EXAM– Wednesday, December 9th from (10:15-12:15) (5:00-7:00)	**Portfolios Due for Summative Assessment**

ISCI 3103 - Evidence of Achievement = Course Portfolio

(Do Not Put Anything in This Document that Is not Your Own Coursework)
(No Syllabus, No Blank Paper, No Xeroxes other than Handouts with work on them)

Inquiry-Oriented Lessons - Section with Creative Cover Page for Each Week of Class

For Each Weekly Lesson: Lab & Lecture Notes, Any Handouts, & Weekly Learning Cycle 3E Summary

Explorations: Elaborate a synthesis of the purposes of all activities. Consider why these were chosen to generate interest in the topic. Do NOT restate **what** was done. Emphasize **why** it was done.

Explanation: Use the Lecture Notes & Text to Complete a Summary depicting the Central Concepts Covered

Extension: Work beyond the class meeting to consolidate understanding and create applications for the poster

Evaluation Rubric for 3E –Write-Ups

	Things to Avoid	Barely Adequate - 1	Satisfactory/Good – 3	Outstanding - 5
Exploration	Essentially Restates What Happened	Clear Description of Scientific Purpose	Synthesis of Results Tabular or Graphic Display of Data	Analysis & Inference of Connection to Main Topic
Explanation	Mechanical Description Rewriting Lecture Notes	›7 Key Terms Defined & Underlined	Information from Text Explicitly Included Evidence of Understanding	Summary of Lectures Recognition of Concepts Sophisticated Synthesis
Extension	Thoughtless Reference to Website Information Unexplained Pictures	Evidence of Additional Information from Outside Sources	Creative Visual Display of Scientific Concepts	Connections Made to GPS Characteristics of Science Specific Content Area

Major Individual Reports

Sapelo Island Photo-Narrative

Map, Abiotic Conditions & Physiogeography
Biodiversity Display – Prokaryotes, Protists, Fungi, Plants, & Animals
Photo Collages of Producers, Consumers, & Decomposers & Community Food Web
Symbiotic Pairs, Human Impacts, & Abstract

Environmental Issue PowerPoint

Outline of Global Issue & Application to Georgia
Individual Slide Set Drafts & Group's Final PowerPoint
Presentation Handout

Oral Report Grading Rubric

	‹70%	80%	90%	100%
Slides	Errors Too Much Text Blurry Images	› Six Slides Decent Images Intro & Concl	Striking Visual Displays Sharp Layouts	Enhancement of Topic
Indiv	Obviously Minimal Effort Mistakes on Info	Not Enough Solid Content	Accurate Portrayal of Subject	Exceptionally Creative Enthusiastic
Group	Lack of Coordination Late Submission, Uncooperative	Cohesive & Coherent Activity/Demo	Strong Intro & Concl Evidence of Cooperation	Lively, Entertaining & Educational

Creativity & Illustrations: This Portfolio should be much more than a sterile display of coursework. As preparation for teaching science to young students, think about colorful ways to show understanding and appreciation of the information. Use Google or other engines to download images for visual displays. If you have a camera, take pictures on our field trips.

Work Ethic: This course has an accurate reputation for being "a lot of work." Effort required will be rewarded by gains in understanding of scientific information. Success depends on consistent effort and hard work. Grades are based on the quality of the product produced, not the time spent on assignments. Get your work done and do not waste your energy complaining. Teaching K-12 is much more work than you are doing now as a student!!!

Grading: The Portfolio will be given a preliminary grade as formative assessment after the midterm and a full summative assessment after the final exam that counts twice as much as the first grade. Concentrate on demonstrating critical synthesis of every class session. If any lessons are not completed and summarized, the portfolio grade will not be any greater than a "C" regardless of other efforts. Top grades will be awarded for clear evidence of **Clear, Consistent, and Convincing** comprehension of the material. It is extremely important to focus on building a document that clearly demonstrates understanding of the course content. **The grade will be a reflection of the quality of the work presented. It will not be a measure of the amount of time spent on the assignments. Remember: the grade is based on a demonstration of what was learned; it is not given for the size of the Portfolio.**

Portfolio Construction Guidelines

PORTFOLIO	**Insufficient** <70% Things to Avoid	**Minimal** <70% Basic Components	**Adequate** >80% Solid Effort	**Outstanding** >90% Exceptional/Excellent
Product				
Structure	Blank Cover/No Tabs	Labeled Tabs Showing	Pictures on Dividers	Creative Innovations
Inclusions	Messy/Disorganized	Several Throughout	Consistent for Chapters	Additional Material
Organization	Empty/Excess Pages	Consistent Sequence	Follows Checklist	Neat & Concise Document
Skill				
3E Write-Ups	Any Reports Missing	3 Named Paragraphs	>300 Words Each Par	Augmented w/ Photos
Outside Learning	Long Websites/No Notes	Use of Internet	Text Reading Notes	Other Good Sources
Summary Narratives	"GSP" Errors	Typed, Single Spacing	Full Page of Analysis	Detailed Unit Summaries
Knowledge				
Science Content	Errors & Mistakes	Keywords Explained	Personal Definitions	Highlights Major Concepts
Scientific Processes	Ignored	Noted in Lab Activities	Field Trips Described	Part of Chapter Summaries
Text Objectives	Failure to Mention	Some Attention Given	Each Stated in Notes	Effort to Elaborate
Reasoning				
Content Analysis	Nothing Beyond Class	Outlined as Covered	Elaborate Explanation	Significant Synthesis
Nature of Science	Ignores Importance	Mentioned	Clear Description	Definite Understanding
Intersection (C&NOS)	Absent	Discussed	Explained in Detail	Obvious Appreciation
Disposition				
Engagement	Minimalist Posture	Basic Effort	Good Work	Appreciation of Learning
Reflection	Absence of First Person	Some Thoughts	Metacognition Shown	Superior Personal Insight
PCK	GPS w/ No Comment	GPS Connections	Pedagogy of Science	Articulation of Significance

Knowledge Construction:

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. The Course Portfolio is also too important to be thrown together at the last minute. Therefore, regular short assignments submitted through *Blazeview* 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 one week after they are assigned. These will be graded on a 10 point scale as follows: (10=Excellent, 8=Good, 6=Adequate/Minimal).

Course Grading Contract:

For a C:

Every weekly lesson, trip, & reflection covered in Portfolio
Completion of each project
Class Average 70-79%

For a B:

Good 3E Reports, Trip Summaries, & Teaching Reflections
Decent Participation Points
Class Average 80-89%

For an A:

Excellent 3E & Field Trip Reports
Cumulative Summary Statement
Class Average > 90%

Reading: Concepts of Biology, 3rd Edition. (2016). Sylvia Mader, McGraw Hill
This introductory textbook for biology majors is unique because there are reading objectives throughout the chapters to focus attention on important content. Reading for science is very different from other types of reading. Science teachers need to be prepared to teach students to read different sources of information. Concentrate on the reading objectives, complete the *LearnSmart* assignments by the deadlines, and demonstrate the comprehension of these topics with reading notes on the chapters or the summaries at the end of each chapter. Concentrate on doing selective reading which means there is no need to spend time on information that goes into detail over subjects that were not covered in class.

GPS - The complete set of Life Science Standards will be posted on *Blazeview* in a condensed form, and students are expected to address them in detailed reflections in the Portfolio. Document how each week of the course connects to them. Pay special attention to documenting how demonstration of the ***Major Skills to Maintain***, ***Common Strands in Life Science***, ***Other Major Concepts and Reading Standard Comment***.

Grading:

Average for Short Assignments	10%
LearnSmart & Connect	10%
Portfolio Grade - Formative & Summative Evaluations	25%
Midterms	15%
Final Exam	20%
Sapelo Report	5%
Environmental Issue (Individual & Group)	5%
Class Participation	10%

Attendance: Since more than 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 Participation: The learning environment has a very significant impact on the satisfaction and success of all students. Therefore, certain standards of decorum will be expected and maintained so that everyone can enjoy the course as much as possible. Consistent positive contributions and exceptional efforts that enhance the experiences of other students will be valorized. This grade will be reduced at the discretion of the instructor for inappropriate conduct such as rudeness, lack of collegiality, or other negative behavior. **Class Trip: Sapelo Island (11/2-4)**

Scoring

	50%	75%	100%	125%
Attendance	2 Unexcused	3 xTardy/ 1 Unexcused	All Made-Up	No Tardies or Absences
Deportment	Rude/Impolite Disrupts Class	Passive in Class Off-Task	Volunteers Answers Involved in Labs	Very Active Participant Enhances Class Sessions

Class Participation Points:

Attendance - 25 points lost for each unexcused absence or 3 tardies & 25 Extra points for no absences or tardies
Deportment - Points deducted for rudeness or anything disruptive and food/drink in lab & Points Added for voluntarily prepping labs, etc.
Class Trip to Sapelo Island
Teaching Experiences (w/ Reflections)
Science Seminars - (w/ write-up) Schedule: http://www.valdosta.edu/colleges/arts-sciences/science-seminars/2015-fall/
Environmental Education (WET, WILD, PLT)
Outside Reading- Books & Scientific Papers (w/ Prior Approval)

Voluntary & Service Activity: This dimension of the course allows you to make decisions and enhance your grade. The Sapelo trip is voluntary because the Sapelo Report can be done from the Web. There will be several teaching opportunities that occur outside of class time. I can use help organizing the prep room and doing the prep for labs. I also have ongoing projects building the displays in the Atrium. Each activity will count for a certain number of points at a rate of ~1 point/hour. Some points will be given for just doing something, others will require written summaries. Sloppy or incomplete efforts will not be accepted. The single criteria for evaluation will be "evidence of a significant effort to enhance personal pedagogical knowledge." For some, reflection is expected as documentation of what was learned through these opportunities. Any additional projects that you might propose outside of those offered in the course must be approved in advance for credit.

Expectations on ISCI 3103 Writing Assignments

Objective
Written assignments will reinforce class lessons and will help you to learn, outside the classroom, through your own thinking. Papers are an opportunity to display your knowledge through more than just exams or what you might or might not say in class. These assignments also allow you to show your own style of expression and personal interests, so you should take pride them.

Focus
Well-crafted writing always has a specific purpose. Every paragraph or paper should have a distinct thesis or central idea. Your thesis should directly address the nature of the writing assignment. Decide on the topic and a specific case you want to make before you start writing. Write the thesis or topic sentence down and check back throughout the writing process to be certain that the work supports it. Concentrate on demonstrating your understanding of the scientific information.

Paper Organization
Before you begin to write, think through how you plan to develop your thesis and use an outline to structure the paper. An Introduction and Conclusion will be the first and last paragraphs of your paper. Start paper with something catchy to interest the reader. Make it perfectly clear, in this introductory section, what your point or central idea will be. Support that concept throughout the body of your paper. Paragraphs in the middle will be the Body of your text. Subheadings should be used for clarity. Your assignments in this class should usually be in first person. Avoid using statements such as "In this paper I will discuss…" since it is much more sophisticated to avoid this type of "crutch statement."

Paragraphs
Divide the paper by major themes and make each of these a distinct paragraph. You should have at least 3 paragraphs on a 1-page, single-spaced paper. The first sentence of each paragraph is a topic sentence that shows what the paragraph cover. ONE SENTENCE IS NEVER AN ENTIRE PARAGRAPH because there should be at least 3 sentences elaborating any significant idea.

Format
A header on the upper right should include the student's name and the date of submission. Each paper should have a creative title identifying the approach to the assignment. Since the course will be paperless, coversheets are not necessary. Your papers are to be typed using something comparable to 10-12 point Times New Roman type, single-spacing, and reasonable (0.5 to 1 inch) margins. Other professors often expect double-spacing, **I require single-spacing**. The lengths of these papers are stated in the assignments. After your draft your ideas, if the paper is too long, go back through and shorten it up by taking out the less important aspects. If it is too short, go back and incorporate more support or add more detail to what you are saying. When I say 1 page that means one sheet of paper that is full of text. Put your references and heading on that sheet. Use the word counting function on your word processor to be sure your text is 600-800 words per assigned page when single-spaced.

References
Any very general scientific information does not need to be cited. We consider this common knowledge because the place you found it is not the original source of the information. How would you know? The answer is if you can find the same information in 2 or 3 books, it does not require a citation in the text or a reference at the end of the paper. However, you must be very careful about giving appropriate credit to the sources of any original outside information that you use. If you use original information, it should be cited in the text of the paper. You also should have properly formatted references at the end of the paper that include: Author (Last name, Initials), Year (In parentheses), Title, Place & Name of Publisher, Pages. Use the APA or American Psychological Association style and check the web if you want an example of this. Even WWWeb sources must be cited properly. Be sure to reword or paraphrase text from any of your sources to avoid plagiarism. Paraphrasing means changing more than 1 word in a sentence. Think about what something says and completely restate it in your own words. No direct quotes are allowed in papers for this course to prevent you from making your paper look like a mosaic of other people's ideas. The point of writing is to demonstrate your thinking, so first person is usually fine.

Grading
Your assignments will be described in detail in lecture, so listen carefully and be sure that you know what is expected or ask about anything that is unclear. Grades will be docked for any failure to follow directions precisely. If you need more clarification than is given in the Blazeview description, contact your classmates by email, phone, or posting a question on the *Blazeview* discussion board. Focus on the objective of the assignment and address it clearly in thesis of your paper. You can dramatically improve your work if you critique your own rough draft and revise it at least once. Outside feedback can also make a difference. Proofread to avoid careless errors. Spelling, Punctuation, and Grammar do effect our impression of the quality of your presentation. These papers will be graded on Effort, Quality, Organization, Content, Proper citations and whether or not you followed these directions. I will look specifically at extent of your coverage of the topic and the clarity in your presentation of the material. If you need assistance with your writing, please see me for help and/or contact the Student Success Center. There will be a due date on the *Blazeview* assignments. If you miss that, you have 24 hours to submit the assignment late with a 10% reduction in the grade before you are locked out. I will not accept late work after that!