



**Western Connecticut State University**  
**Department of Biological and Environmental Sciences**  
**Scientific Inquiry in the Field Spring 2016**

**Course Number:** Bio 107  
**Course Name:** Scientific Inquiry in the Field  
**Semester Hours:** 4 (45 hours lecture and 45 hours lab)  
**Professor:** Theodora Pinou, PhD  
**Phone:** 203-837-8793 (office)  
203-837-8791 (department office)  
**Office:** SB 242  
**Office Hours:** TBA  
**E-Mail:** pinout@wcsu.edu  
**FAX:** 203-837-8875  
**Course Room:** SB 240 – Lecture  
Playa Grande, Costa Rica - Lab  
**Course Time:** Lecture Tuesday, January 26<sup>th</sup>, February 2<sup>nd</sup>, 9<sup>th</sup>, March 1<sup>st</sup> 8<sup>th</sup> and 15<sup>th</sup>, and April 5<sup>th</sup> 5:25 – 7:25PM.  
Field Lab during March 14<sup>th</sup> – March 22<sup>nd</sup>.

**General Education Competency Designation – Scientific Inquiry**

Science is a way of knowing based on empirical observation and verification. Scientific inquiry involves asking appropriate questions, designing and implementing strategies to answer those questions, and interpreting and explaining the results within a disciplinary/theoretical context.

**WCSU Information and School Cancellations:** Check WCSU's homepage ([www.wcsu.edu](http://www.wcsu.edu)). Sign up for the Emergency notification system: <http://www.wcsu.edu/ens/>.

**I. Course Description**

*Scientific Inquiry in the Field* teaches appropriate field biology techniques, to record observations, and build hypotheses through inductive and deductive processes. This course immerses students in an outdoor laboratory setting and focuses on natural history, discovery through observation, and/or the conservation and management of biodiversity. Students use the outdoors as a laboratory from which to observe, record, and test natural phenomenon. Through the activities of this course students will participate in established conservation or field management programs. Students will be required to keep an accurate and detailed field journal that will include records of lab activities, species descriptions and drawings, and habitat accounts.

## **II. Required Texts and Materials:**

1. Graham, M, Parker, J, and Dayton, P. 2011. *The Essential Naturalist: Timeless Readings in Natural History*. University of Chicago Press. ISBN-13: 9780226305707.
2. Price, Daniel. 1999. *How to Make a Journal of Your Life*. Simon and Schuster, Australia. ISBN:1-58008-093-6.
3. Kricher, John. 1999. *A Neotropical Companion. An Introduction to the Animals, Plants, & Ecosystems of the New World Tropics (2<sup>nd</sup> edition)*. Princeton University Press, Princeton, NJ. ISBN: 978-0-691-00974-2.
4. A working flashlight or headlamp, Field Lab Notebook (To be discussed in class) and a mechanical pencil with plenty of lead.

### **Optional**

Binoculars and cameras recommended but not required.

The following bookstore web site contains this information by term/department/course and section. <http://wcsu.bncollege.com/webapp/wcs/stores/servlet/TBWizardView?catalogId=10001&storeId=47055&langId=-1>

## **III. COURSE OBJECTIVE & LEARNING OUTCOMES**

**As a result of this course students will be able to:**

1. Broadly explain how living systems are interconnected and interacting (Departmental goal)

### ***Scientific Inquiry Learning Outcomes***

2. Develop research questions or hypotheses through induction or deduction through observation.
3. Design a strategy to test or address the hypothesis or research question within the limits of the field experience.
4. Implement the research design strategy with faculty oversight in the field.
5. Interpret the results within the context of biodiversity and conservation disciplines.
6. The student will be able to effectively communicate and defend learning outcomes 2 - 5 through journaling and discourse.

## **IV. Grading**

***By enrolling in this course, I affirm and agree that any of my work that is submitted for credit may be checked with Turnitin.com for detection of plagiarism.***

### **Assessment:**

The presentations, discussions, and activities will be provided based on the assumption that you have read any assigned readings prior to attending the associated class. Candidates are expected to complete the following:

Activities and Assessment Tools	Percentage
Warm Up Ecotourism Assignment ( <b>100 points</b> )	10%
Pre-field Biodiversity Exam ( <b>100 points</b> )	10%
Laboratory Field Journal with daily reflective notes & species pages ( <b>500 points</b> )	50%
Inquiry Activities (2 worth <b>100 points</b> ) ( <i>Gen Ed Assessment assignment</i> )	25%
Attendance & field disposition/attitude ( <b>100 points</b> )	5%
<b>Total</b>	<b>100%</b>

The standard letter grade system will be employed for this course:

Final Letter Grade	Numerical/Points	Quality Point Value
A	940 or better	4.0
A-	890 – 939.9	3.67
B+	870 – 889.9	3.33
B	840 – 869.9	3.0
B-	800 – 839.9	2.67
C+	767 – 799.9	2.33
C	733 – 766.9	2.0
C-	700 – 732.9	1.67
D+	650 -699.9	1.33
D	600 – 649.9	1.0
D-	580 – 599.9	0.67
F	≤ 579.9	0

## V. Class Schedule and Topical Outline

Scientific Inquiry in the Field Bio 107: The assignments for this course are broken into two parts. Part I is the pre-departure schedule. Part II takes place in Costa Rica. Please be sure to pay close attention to the dates and the contexts of each assignment

**Part I: Tuesdays 5:25 – 7:25PM Room 240S B**

Date	Topic	Learning Objectives	Reading Assignments
January 26	1. Introduction to Course and Journaling	1. Introduction to the Tropics and expected biodiversity. 2. How to document journaling reflections; examples from Naturalists.	Bring Textbooks to class. Selected readings from Graham et al. (TBA)
February 2	2. The Power of Field Observation	2. Documenting Phenomena 2. Stating a hypothesis 3. Making a prediction 4. The Alternative Hypothesis	READ the entire Price Book (appx.40 pages)
February 9	What are Endangered Species and why are they of special concern? WHO CARES?? HINT: Do they tell us anything about ourselves? 2. Documenting Biodiversity	1. To build empathy about Conservation Practices around the world. <u>Is Ecotourism good or bad?</u>  2. Documenting Biodiversity through Illustration, photography, sound, museums and collections	Chapter 14 –Handouts (Deforestation and Conservation of Biodiversity) and Appendix (Hey, Let’s be Careful Out There) (pp 334 – 388) Of Kricher’s Neotropical Companion. <b>(Ecotourism Assignment Due)</b>
<b>February 9: Warm Up/Ecotourism Assignment due: See details on pp. 7-8 of this syllabus</b>			
March 1	1. Sampling Biodiversity in: Terrestrial, Aquatic, and Marine Habitats.	1. To evaluate the relationship between people and their land.	Be prepared to discuss Chapters 6 (The Neotropical Pharmacy) and 11 (Coastal Ecosystems, Mangroves, Seagrass, and Coral Reefs) Of Kricher’s Neotropical Companion.
March 8th	1. Reporting Biodiversity in terms of Biodiversity Indexes	1. To discuss the rights and responsibilities that scientists have to the international community?	Selected readings from Graham et al. (TBA)

March 15th	1. Reflecting on Naturalists and their notebooks. 2. responsibilities and course expectations	1. Compare and contrast historical and contemporary naturalists.	(EXAM)
------------	--	--	--------

**March 15<sup>th</sup> at the end of class Pre-Field Biodiversity Exam** - Open Book test that will assess your preparation for traveling in the field. It will measure safety, personal responsibility, and disposition, as well as your understanding of the interrelationships between organisms in a field-location of study. It will evaluate your understanding of ethics and respect in the field in a group/team setting. It will measure your understanding of how to journal and sample in the field, and the time management required to effectively perform these tasks. You must show proficiency before you can travel. Students that do not show proficiency will be required to spend every moment of their time in Costa Rica with Dr. Pinou

March 19 – 27	The Applied Scientific Inquiry Component of the course: 1. Analysis of data 2. Conclusions & presentations	To explore and document, and explain biodiversity.	Journaling and Scientific Inquiry Worksheets to summarize lab activities.
---------------	--	--	---

April 5th	Reflecting on our learning.  1. Conservation Laws and Practices; Local versus global.	To compare and contrast the terrestrial and aquatic life. Summarizing morphological and physiological adaptations of tropical plant and animals.	Journals collected and Final Exam.
-----------	---	--	------------------------------------

**April 5<sup>th</sup> Final Exam.** The final exam is cumulative and will include 40 multiple choice questions (2 points each), and four (of seven) short essay questions (5 points each). Time allowed for the final exam is 60 minutes.

**Journals:** Remaining class time will be used to polish journals and make sure they are ready to be submitted. (See journal instructions on p. 9 of the syllabus)

## Part II: Field Lab Schedule in Costa Rica March 19-27:

Mar 19:	Arrive San Jose Costa Rica 14:30 - 16:30 Orientation, Unpack, 22:30 – 24:00 TBA ; Group Dinner in San Jose
Mar 20:	9:00 – 10:00 Breakfast 11:00 Visit Crater of Volcan Póas National Park 14:00 Lunch in Park on your own 15:00 – 17:00 Travel to Las Logos 18:00 Group Dinner 20:00 Lecture: Field Notes Summary

Mar 21:	9:00	Breakfast
	10:00	Travel to Volcan Arenal in Monteverde
	12:00	Hiking Tropical Rain Forest – Compare and Contrast Lab
	18:00	Group Dinner
	19:30– 00:30	Finalizing Field Notes
Mar 22:	9:00	Breakfast
	10:30	Travel to Horizontes –Dry deciduous forest and experimental Ag-station
	10:30 – 1600	Lunch on the Road – personal expense
	18:00	Group Dinner at Horizontes
	20:00	Visit to Cabuyal Beach
Mar 23:	9:00	Pack to Leave Horizontes
	10:00	Breakfast
	11:30	Compare and contrast Rainy vs Dry tropical Forest
	14:00	Leave for Las Baulas National Park – <u>Lunch on your own.</u>
	18:00	Dinner at Kikes
	19:30	Playa La Gloria Lecture
	20:30-02:30	Turtle Patrol
Mar 24	5:00 – 9:00	Morning Beach Patrol
	10:00	Breakfast
	12::30 – 15:30	Transect Lab Playa Carbon <b>*INQUIRY ACTIVITY</b>
	15:30 – 17:30	Notebook reflections and instructor feedback
	18:00	Dinner
	20:00	Competition Lecture
	21 :00	Beach Patrol
Mar 25	5:00 – 7:00	Morning Beach Patrol
	11:00	Breakfast
	13:30- 18:00	Estuary Survey and Lab <b>*INQUIRY ACTIVITY</b>
	19:00	Dinner
	20:30	Patrol and evening note taking
Mar 26	5:00 – 8:00	Morning Beach Patrol
	9:00	Data Clean-up
	11:00	Breakfast
	12:00- 16:00	Snorkeling in Playa De Los Pirates – Recording Marine Biodiversity
	18:00	Pizza Dinner
	20:00	Kareoke, Local cultural dances,
Mar 27	5:00	Pack, leave for the Liberia airport & Home

## **VI. Academic Honest Policy**

<http://www.wcsu.edu/facultystaff/handbook/forms/honesty-policy.pdf>

## **VII. Disability Accommodation**

Americans with Disabilities Act: The Department of Biological and Environmental Sciences does not discriminate on the basis of disability as regards to any program or activity covered by federal or state laws and regulations. It is each candidate's responsibility to inform the Affirmative Action Officer at (203) 837-8277, and the course instructor of any condition that requires modification. If you have a disability and would like to request accommodations, please visit Accessibility Services, located in Higgins Annex 017. They will give you an accommodation letter which you should bring to me as soon as possible. If you have a letter from Accessibility Services for accommodations, please let me know immediately, so we can put those accommodations in place.

Accessibility website <http://www.wcsu.edu/accessability/>

## **VIII. Technology Disclaimer**

**WARNING!** User discretion is advised in all courses. When you connect to the Internet your hardware/software is vulnerable to security threats, offensive content, explicit images, and profane language. When you go online in this course, you accept total responsibility for what you see, read, hear, and do. If you are concerned about encountering offensive content online, please immediately withdraw from this course. <http://www.cslib.org/eisguide.htm>

## **IX. Course Policies and Procedures**

1. Your final grade is a combination of lecture and lab (see IV. Grading). Attendance counts and will be taken at the beginning of every class. It is your responsibility to sign-in. Signing a name other than your own is an act of academic dishonesty that will be reported to the Office of Student Affairs and will result in serious penalties.
2. You must bring your textbook to class every day. If you do not then 1 point will be deducted from attendance and disposition. Your textbook can be in electronic format.
3. You are expected to participate in class discussions and to take class notes.
4. All assignments are due as noted on the syllabus. Two points will be deducted for every late day.
5. Please turn all phones and personal electronic devices off, or to vibrate while in class.
6. You must wear proper attire in the field. Closed toed shoes, long hair tied back, clothing to cover most of your body, sunscreen and insect repellent. I would advise that you bring a light jacket or sweater because the beach can get chilly in the evening.

## **X. Assignment Descriptions and Rubrics**

**Warm Up/Ecotourism Assignment:** This is an independent writing assignment that requires that every student understand the advantages and disadvantages of “ECOTOURISM.” It will require that you find information that is valid. This means that the articles or books you read must be written by reputable authors, and based on evidence and accurate interpretation. You are free to use the Internet to obtain information, but you must cite your sources and be sure that you can justify why your information is legitimate. When we return from this field experience you will be asked to comment on whether you think the travel experience qualifies as “Ecotourism.” This assignment also prepares you to think like a scientist and learn to ask meaningful questions. **(Due February 9th)**



**Warmup assignment Rubric/Outline (100 Points)**

After completing all the required fields below, write your report in single sided, double spaced format. The font should not be smaller than 12 points. **We will be using the Journal of Natural History** as a **guide** for writing and the bibliography see ([www.tandf.co.uk/journals/authors/style/quickref/tf\\_C.pdf](http://www.tandf.co.uk/journals/authors/style/quickref/tf_C.pdf)).

	1. What is Ecotourism? <b>(10 points)</b>
	2. Provide an example of ecotourism in the United States and another example from Latin America, Asian, or Africa. Explain your reasoning for why these qualify as examples of Ecotourism. <b>(30 points)</b>
	3. What do you find most interesting about your chosen examples? Explain in a well- developed paragraph. <b>(10 points)</b>
	4. Provide two advantages and two disadvantages of Ecotourism. <b>(15 points)</b>
	5. Under what conditions do you feel Ecotourism is a successful strategy of conservation practice? Why? <b>(8 points)</b>
	6. Under what conditions do you feel Ecotourism is a poor strategy of conservation practice? <b>(8 points)</b>
	7. Do you see yourself involved in any aspect of the Ecotourism Industry? Explain your response. <b>(4 points)</b>
	8. State a single question you would like to investigate about Ecotourism and explain in a well-developed paragraph why you feel this is a valuable question. <b>(15 points)</b>

<p>Student Name:</p> <p>_____</p> <p>FINAL SCORE:</p>
---

**Field Notebook/Journal Format:** Field Notebooks will be reviewed while on the field by Dr. Pinou to assure proper format is being followed. **(Due April 5th)**

**Notebooks will not be accepted unless they are in proper format. The format consists of:**

1. The student's name and course number should be clearly indicated in the front of the Journal.
2. The Journal should have an expandable *Table of Contents* that lists each day's lab activity and the page number. **ALL WRITING IS DONE IN PENCIL!**
3. Each day the student will date the top right of the page and begin the Journal record.
4. A Journal record includes a daily objective.
5. A Journal record includes military time for each documented journaling observation.
6. A Journal record includes a description of the weather and climate conditions under which you are recording an observation.
7. At the end of a day's entry you must include a species list.
8. At the end of your Journal you should keep species pages that include important field characters and helpful hints for identification.
9. You are encouraged to use illustrations/drawings to remember where you are and what you see. These can be photographs too.
10. Scientific Inquiry worksheets should be attached to the end of your daily account.

## **Inquiry Activity Format**

**Name:**

**Inquiry Activity Title:**

**Scientific Inquiry Worksheet: Turn in with any accompanying graph(s) at the end of the lab period. YOU MUST CHECK** writing (e.g., grammar, spelling).

1. **Why do you want to know?** Explain the biological context for conducting the study?
2. **Clearly state the hypothesis** that was tested and briefly explain the rationale for this hypothesis.
3. **How was the study conducted?** Briefly describe the experimental design. What were the dependent and independent variables? What controls were used and why?
4. **What were the results?** Graph the results on graph paper. Attach graph(s) to this sheet. Make sure graphs are clear and appropriately labeled.
5. **What do the results mean relative to the biological context?** Was the hypothesis supported or not? Explain your answer, in particular why you think the results turned out the way they did. Briefly explain how the study could be improved upon.



