

IDST 1700 – Topics in the Natural Sciences with Lab – Core 7 or 9
Galapagos Ecology, Evolution, and Conservation

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Introduction to the Course

The Galapagos Islands have always been a scene of remarkable drama, from the volcanoes that brought them forth from the Pacific, to the plant and animal waifs that colonized the islands and gave rise to new forms adapted to their unique conditions, to the voyagers who explored the archipelago in wonder at the strange creatures they found there. Indeed, there may be no better place on earth to witness what the eminent ecologist G. Evelyn Hutchinson called “the ecological theater and the evolutionary play.” In this course we will learn fundamental principles of ecology, evolution, and conservation biology, using the Galapagos as a case study. We will consider the Galapagos’ special place in the history of science as we study the work of Charles Darwin, Peter and Rosemary Grant, and others whose research on the islands and surrounding marine reserve have enhanced our understanding of the evolution of biodiversity. We will learn about the history of the Galapagos, its cultural heritage, and the interaction between people and the natural environment of the archipelago.

The course will begin during the spring semester, when we will have six meetings that will serve as an introduction to life and culture in Ecuador, the natural history of the Galapagos, the significance of the archipelago in the history of science, and current issues in conservation as exemplified by the Galapagos. We will also have five lab periods at Millsaps during the first week of May. The labs will allow us to explore the mechanisms of evolution and to become familiar with the means by which biologists trace the evolutionary relationships among organisms. Our trip to Ecuador, including Galapagos, will take place June 1-11.

Our travels will begin in Quito, the capital of Ecuador, which lies just a few miles south of the equator at an altitude of about 9000 feet in a river valley between peaks of the Andes. Quito was the world’s first city designated as a World Heritage site by UNESCO, which recognized it as having “the best preserved, least altered historic centre in Latin America.” After spending two days in Quito, we will fly to the Galapagos, where we will transfer to the Motor Yacht *Floreana*, which will be our home for the next week as we travel to eight of the islands of the archipelago. Upon our return to the mainland, we will spend one more night in Quito before departing Ecuador.

Objectives

The objectives of this course are:

- to become familiar with major concepts in ecology, evolution, biogeography, and conservation biology as illustrated by the Galapagos islands and surrounding marine reserve
- to increase our understanding and appreciation of the people and culture of Ecuador
- to become familiar with methods of scientific research.

Liberal Arts Abilities

As a part of the core curriculum at Millsaps, IDST 1700 is designed to help you develop the core abilities that are the hallmark of a liberally educated person. In particular, this course will help you develop:

- **Reasoning** – *the ability to analyze and synthesize arguments, to question assumptions, to evaluate evidence, to argue positions, to draw conclusions, and to raise new questions.* The strange landscape and wildlife of the Galapagos raise many questions in the minds of travelers. How were the islands formed? How did its creatures come to be? What impacts are people having on its unique ecosystems and how will that affect the future of the archipelago? As we ask these questions and many more, we will analyze evidence, draw conclusions, and consider the implications of our findings.
- **Communication** – *the ability to express ideas, arguments, and information coherently and persuasively orally and in writing.* Exams, journals, and class discussions will provide many opportunities to enhance your ability to write and speak clearly.
- **Historical Consciousness** – *the ability to understand the achievements, problems, and perspectives of the past and to recognize their influence upon the course of events.* As we walk in Darwin’s footsteps and read his account of the H.M.S. Beagle’s famous voyage, we will have the opportunity to trace the development of one of the most influential ideas in the history of science. We will see how others have built on Darwin’s ideas, leading to our current understanding of the evolution and diversity of life.
- **Social & Cultural Awareness** – *the ability to engage perspectives other than one’s own.* One of the most valuable benefits of study abroad is the opportunity to experience another culture firsthand. A major focus of this course is to gain an appreciation of the history, people, and culture of Ecuador, including the Galapagos.

Accommodations for Students with Disabilities

Students who require special accommodations due to a disability should make an appointment to see Patrick Cooper, the Director of Services for Students with Disabilities, Room 320 in the College Center. He can be reached at coopeap@millsaps.edu or 601-974-1228.

Grading

There will be an in-class exam worth 100 points, a take-home exam worth 100 points, and five lab exercises worth 20 points each. You will choose five journal entries to submit for a grade; together they will count for 100 points. Attendance, participation, and conduct will count 100 points. A report on one of the lab exercises may be submitted to the Writing Center to be assessed for your writing portfolio. Additional assignments may be announced. Your grade will be based on the percentage of the points you have earned of the total possible. Letter grades will be assigned as follows:

93-100%	A	77- 79%	C+
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90- 92%	A-	73- 76%	C
87- 89%	B+	70- 72%	C-
83- 86%	B	67- 69%	D+
80- 82%	B-	60- 66%	D
		below 60%	F

Textbooks (Tentative List)

Required:

The Voyage of the Beagle and *The Origin of Species* by Charles Darwin

Note: Many editions of these two books are available, including a number of affordable paperbacks. All of Darwin's published works as well as many of his handwritten manuscripts and private papers are available at: <http://darwin-online.org.uk/>

Galapagos: A Natural History Guide, 2nd edition by Michael H. Jackson (1998) University of Calgary Press, Calgary.

In Focus Ecuador: A Guide to the People, Politics and Culture by Wilma Roos and Omer van Renterghem (2000), Interlink Books, New York.

Recommended:

The Beak of the Finch: A Story of Evolution in Our Time by Jonathan Weiner (1995). Vintage Books, New York.

Evolution's Workshop: God and Science on the Galapagos Islands by Edward J. Larson (2001). Basic Books: New York.

ACADEMIC HONOR CODE of MILLSAPS COLLEGE

Millsaps College is an academic community dedicated to the pursuit of scholarly inquiry and intellectual growth. The foundation of this community is a spirit of personal honesty and mutual trust. Through their Honor Code, the students of Millsaps College affirm their adherence to these basic ethical principles.

An Honor Code is not simply a set of rules and procedures governing students' academic conduct. It is an opportunity to put personal responsibility and integrity into action. When students agree to abide by an Honor Code, they liberate themselves to pursue their academic goals in an atmosphere of mutual confidence and respect.

The success of the Code depends on the support of each member of the community. Students and faculty alike commit themselves in their work to the principles of academic honesty. When they become aware of infractions, both students and faculty are obligated to report them to the Honor Council, which is responsible for enforcement.

The pledge signed by all students upon entering the College is as follows:

As a Millsaps College student, I hereby affirm that I understand the Honor Code and

am aware of its implications and of my responsibility to the Code. In the interests of expanding the atmosphere of respect and trust in the College, I promise to uphold the Honor Code and I will not tolerate dishonest behavior in myself or in others.

Each examination, quiz, or other assignment that is to be graded will carry the written pledge: "**I hereby certify that I have neither given nor received unauthorized aid on this assignment. (Signature)**" The abbreviation "Pledged" followed by the student's signature has the same meaning and may be acceptable on assignments other than final examinations.

It is the responsibility of students and faculty to report offenses to the Honor Code Council in the form of a written report. This account must be signed, the accusation explained in as much detail as possible, and submitted to the Dean of the College.

Schedule

Class meetings at Millsaps

(One meeting per week; day, time and room number TBA.)

<u>Week of</u>	<u>Topic</u>
January 11	Overview
January 18	Life and culture in Ecuador: guest speakers Dr. Markus Tellkamp and Dr. Jessica Piekielek
February 1	Geological history and biogeography
February 8	Terrestrial and marine life
February 15	The Voyage of the <i>Beagle</i> , Darwin, and the development of the theory of evolution
February 22	Current research in the Galapagos and issues in conservation

Lab meetings (1-4 pm in 255 Olin)

May 3	DNA & heredity
May 4	Genes, chromosomes, and genetic diversity
May 5	Microevolution
May 6	Macroevolution
May 7	Methods in systematics

Travel in Ecuador

June 1	Arrive in Quito, Ecuador
June 2	Tour Quito
June 3	Flight to Galapagos; Transfer to M/Y <i>Floreana</i> . On Santa Cruz Island, travel by bus to the highlands to look for giant tortoises. Visit Los Gemoles, twin lava tunnels.
June 4	Genovesa Island. Visit Prince Philip's Steps and Darwin's Bay. Swim from the beach with sea lions. Look for red-footed boobies, masked boobies, storm petrels, red-billed tropicbirds, swallow-tailedgulls, and lava gulls. Visit <i>Opuntia</i> cactus forest, mangroves, and look for marine life in the intertidal zone.

- June 5 Visit lava formations on Santiago and Bartholome including the landmark, Pinnacle Rock. Look for Galapagos penguins.
- June 6 On Santiago, visit the formation known as Sombrero Chino or “Chinese Hat,” home to a colony of sea lions as well as marine iguanas and lava lizards. Snorkel from the beach. Visit Dragon Hill, named for its land iguanas. Explore saltwater lagoons frequented by flamingos.
- June 7 On Isabela, visit a branch of the Charles Darwin Research Station, site of the giant tortoise breeding program. In Puerto Villamil, visit a local school for a presentation on the history and traditions of Isabela. Travel to a wetland view many species of wading birds. Then visit the islet of Tintorerias, a good place to see sharks and many other fish.
- June 8 At Punta Espinoza on Fernandina Island, observe flightless cormorants, the mangrove finch, frigate birds, petrels and other birds as well as marine iguanas. From Tagus Cove, hike a trail through several different vegetation zones. We will also see Darwin Lake, a saltwater crater lake.
- June 9 Visit Puerto Egas on Santiago Island. Hike along the coast and look for Galapagos fur seals hunting in the inlets. On Rabida Island look for pelicans nesting and flamingos.
- June 10 On Santa Cruz Island, visit Black Turtle Cove, which harbors many marine species including spotted eagle rays. Transfer to Baltra Island for the flight to Quito. In the afternoon, visit the historic district of Quito.
- June 11 Depart Quito