

Course Syllabus, Spring 2017
BIO 365 / HON 365 / IDS 365
The Natural History of the Galápagos Islands and Ecuador I

I. Basic Information

Purpose: The primary goals of this course are to introduce students to the natural history of the Galápagos Islands and Ecuador and to prepare the students for a faculty-led program during Summer Session I. As part of the preparation for the abroad immersion experience, this course also will introduce students to the culture and history of the Ecuador. In addition to fulfilling the Academic Learning Goals of the course, the class meetings will contribute to team-building among participants and will facilitate cross-cultural and language training and pre-departure preparations for the faculty-led program (two-week trip).

Course Description: An introduction to the natural history (including geology, climate, and the ecology of plants and animals) of the Galápagos Islands and Ecuador, with a reflection on interactions between these and the history, culture and economics of the Islands and continental Ecuador from pre-colonial to modern times. Offered during Spring Semester. (Students must also enroll in BIO 366 / HON 366/ IDS 366, which will be offered during Summer Session I of the same year.)

Course Prerequisites: To receive Biology Option credit for either BIO 365 or HON 365, students must have completed BIO 185 Themes in Biology or BIO 201 Foundations of Biological Inquiry. For other students enrolled in HON 365 and for students in IDS 365, there are no prerequisites. However, permission of instructor (based on acceptance into the faculty-led travel program to the Galápagos Islands and Ecuador) and a signed contract and paid deposit for participation in the trip are required.

Course Credit: 0.5 course credits (2 semester hours) two 80-minute meetings per week. Each student will receive an IP grade for the course until the Summer Session I abroad experience has been completed and the final draft of the student's monograph has been submitted. Students who are graduating seniors need to meet with the instructor in January to discuss arrangements for the awarding of their degree.

Requirements Met by this Course: When taken in conjunction with BIO 366 or HON 366 (and with the BIO 185/BIO 201 prerequisite completed), this course will fulfill the requirements for an Organismal and Evolution Biology Option course. When taken in conjunction with HON 366 or IDS 366, this course will fulfill the requirements for a Natural Sciences Liberal Learning course with a laboratory component. This course also will fulfill the Global Perspectives Civic Responsibility Liberal Learning requirement. When taken in conjunction with BIO 366, HON 366 or IDS 366, this course will fulfill the requirements for a capstone course for the Environmental Studies Concentration. A one credit (¼ course unit) Languages Across the Curriculum independent study may be added to this course for those students who have intermediate level proficiency in Spanish and who wish to complement the work in this course by utilizing their language skills. Please contact Dr. Deborah Compte at dcompte@tcnj.edu for further information.

Course Instructor: Dr. Donald Lovett, Dept. of Biology, BI 206, lovett@tcnj.edu, 771-2876

Required Texts: *Beak of the Finch: A Story of Evolution in Our Time*, J. Weiner. 1994.
On the Origin of Species, C. Darwin. 1859. [excerpts] (*pdf provided via Canvas*)
And one of the following:
Galápagos: A Natural History, M. H. Jackson. 1994.
Galápagos: A Natural History Guide, P. Constant. 2007.
Galápagos: A Natural History, J. Kricher. 2006.

II. Learning Goals

A. Content goals

1. Academic Goals. This course is intended to lead the student to develop an understanding of the following:

- a. The geographic regions and climatic zones of continental Ecuador and the Galápagos Islands, with particular attention given to altitudinal zonation and how the geography, geology (including soil conditions), ocean currents (including El Niño, La Niña, and up-wellings), and climate affect the distribution of terrestrial and marine ecosystems across the landscape of the continental and the islands.
- b. How differences in the dispersal ability of organisms have affected the degree to which the flora and fauna of the islands are endemic (unique to the archipelago and to each island); how species that disperse readily (such as marine birds) are responsible for the colonization of the islands by other types of organisms (especially plant species); how humans are responsible for the historically-recent dispersal and introduction of species to the islands.
- c. How the degree of isolation of the islands and how differences in ecological conditions among the islands have led to adaptive radiation and the formation of endemic species or subspecies that often are distinct from one another among the islands and from their continental ancestors.
- d. The ecological impacts of human populations and introduced species on the island ecosystems; the measures (including the eradication of introduced species) that have been taken to conserve or restore native species; the biological factors (including population genetics) affecting these conservation efforts.
- e. How geography, topography, climate, and distribution of natural habitats have affected the history, development, and economy of Ecuador; how these features have affected the distribution of human civilizations and populations, both historically and in recent times; the impact of historical events (including the rise and fall of the Incan Empire, arrival of Europeans, and modern day industry, commercial exploitation of natural resources, and tourism) on the culture and economics of both continental Ecuador and the Islands.

2. Trip-related Goals.

- a. Contribute to team-building among participants.
- b. Inform students of immunizations and medications that may be needed for the trip (so that they may discuss these with their personal physician) and to educate students in practices that will help minimize the chance of illness during the trip.
- c. Inform students of the cultural norms and practices of Ecuador.
- d. Introduce students to basic Spanish phrases so that they may interact politely with Ecuadorian nationals, particularly with their host family in San Clemente. This will be conducted primarily via on-line “Spanish of the Week” tutorials at <http://galapagos.pages.tcnj.edu/>.
- e. Prepare students for the cross-cultural experience of traveling in a foreign country.

B. Performance Goals

1. Academic Goals.

- a. Students will participate in classroom discussions of the *Origin of Species* and demonstrate an understanding of the ideas of Charles Darwin that were developed from evidence he collected on the Galápagos Islands.
- b. Students will participate in classroom discussions of *The Beak of the Finch* and will demonstrate an understanding of the research results of Peter and Rosemary Grant and the significance of their results in providing evidence for evolution. In addition, students will demonstrate an understanding of the processes that have led to variations (among species between islands and among species on the

same island) that have arisen in response to variations in climate over the span of just a few years. Students also will demonstrate an understanding of recent research in the field of evo-devo that has discovered molecular mechanisms that can explain evolutionary changes (such as those studied by the Grants).

c. Students will identify source materials related to their assigned research topic and will demonstrate an understanding of material related to their assigned topic by preparing and delivering a 20 minute PowerPoint presentation on their topic. Students also will prepare a monograph on their research topic. Students will choose from among the following topics:

1. Tectonic plates, hydrothermal vents, volcanism, types of lava, mountain-building, and geology
2. Ocean currents, prevailing winds (El Niño, La Niña), seasons, climate
3. Mammals (including marine and terrestrial species)
4. Land birds (on the islands)
5. Sea birds
6. Wading birds and shore birds (including freshwater birds, such as ducks)
7. Reptiles
8. Fishes (marine, pelagic/oceanic, brackish)
9. Marine invertebrates (including coral reefs and hydrothermal vent animals), macrophytic algae, and marine habitat formation
10. Terrestrial, brackish, and freshwater invertebrates, and freshwater habitats including fish
11. Woody plants, vegetative zones of the islands
12. Non-woody plants, cacti, non-vascular plants, vegetative zones of the islands
13. Ecological zones in continental Ecuador (inter-montane arid zone, tropical montane cloud forest, *páramo*, montane rainforest, EBA's, IBA's, Choco & other biodiversity hotspots, Cayambe Coca Ecological Reserve)
14. Introduced species, their impact, and their eradication; habitat restoration efforts, maintaining biodiversity.
15. Human influence on natural habitats (other than introduced species and habitat restoration); includes impact of residents/immigrants (population growth), water conservation, waste disposal, agriculture, fisheries and other harvesting, tourism, conservation efforts, maintaining biodiversity/reducing human impacts)
16. Political and economic issues (including ecotourism and environmentalism)

d. Students will demonstrate through group discussions during their abroad experience that they are able to apply the information that they have learned in the classroom to their observations during the faculty-led program. In addition, students will incorporate their mastery of this information and their ability to apply it to observations made during the program in an expanded version of their monograph, which will be submitted within one week of return to the U.S. Literature searches will have been completed during the spring semester in preparation for writing the monograph (due during the spring semester). For students who are enrolled for honors credit, the monograph will be expected to include substantial citations from primary research articles (for science topics) or to incorporate extensive information from supplemental readings relevant to the topic (for non-science topics).

e. Students will demonstrate the ability to make field notes using the 'Grinnell System'.

2. Faculty-Led Travel Program-Related Goals.

a. Students will have all necessary immunizations and will be aware of (and will practice) appropriate measures to protect their health and safety while in Ecuador.

b. While in Ecuador, students will demonstrate an understanding of, and sensitivity to, cultural norms, expected behavior, and basic interpersonal civilities.

III. Student Assessment

A, Assessment Plan

1. Student understanding of (i) the contributions of the Galápagos Islands to Charles Darwin's development of his theory of evolution by natural selection and (ii) the research by the Grants (as outlined in *The Beak of the Finch* and more recent research articles) will be evaluated through in-class essays written by the students.

2. A PowerPoint presentation made to the class and a monograph (final draft due after the faculty-led travel program has been completed) on each student's topic will be used to evaluate the student's ability to understand the basic material within his/her topic and ability to make deeper connections with other aspects of the course and/or published research on the topic.

3. The first submission of the monograph will be due near the end of the spring semester. The purpose of reviewing the draft at this time will be to ensure that the student has incorporated a sufficient number of references and has analyzed and synthesized the topic to an adequate depth. The second submission of the monograph will be due within one week following return to the U.S. (It is expected that students would have worked on their monographs during the abroad experience.) Both the first and the second submission will be evaluated on the basis of how the learning goals and assessment goals listed above were met, the completeness of information incorporated into the monograph (including information from outside references **and IN PARTICULAR from the notes and observations made during the trip**), and the degree to which the learning goals of the course were addressed with respect to each student's particular research topic. Students will be provided with written feedback on the first submission of the monograph and will be required to submit a revised final draft of the monograph within a week of the return from the trip. (This deadline has been developed in coordination with Records and Registration). For students who are enrolled for honors credit, the monograph will be expected to include substantial citations from primary research articles (for science topics) or to incorporate extensive information from supplemental readings relevant to the topic (for non-science topics).

4. Field journal entries that were made using the 'Grinnell System' during observations made on campus will be evaluated for completeness and for adherence to proper format.

5. Students' ability to have completed and submitted all required forms in a timely manner and to have completed all necessary tasks required for the trip prior to departure for the abroad experience will be assessed. Furthermore, students will be evaluated on their responsiveness to requests to provide information regarding either the course or the trip in a timely manner.

B. Rationale

1. Written essays will be used to evaluate student understanding of assigned readings by offering students an opportunity to synthesize concepts learned from both the readings and from classroom discussions of the readings.

2. In preparation for their PowerPoint presentations of their assigned research topic, students will need to seek information (including images) from a diversity of sources and to compile this information in a way that highlights important concepts of their topic.

3. The preparation of the monograph will allow the student to compile and synthesize information obtained from in-class lectures and from textbooks (including natural history guides), primary literature, and other sources prior to departure on the trip. Students will then be able to incorporate information obtained from museums and interpretive centers in Ecuador, provided by Ecuadorian naturalists and guides, and from the student's own observations in the field. These monographs shall be designed to incorporate and address relevant concepts listed in the course's Academic Learning Goals. (For individuals working on specific organisms, the following topics must be included: distribution, life history, ecology, endemism, speciation, and differences between island and continental populations,

global distribution of related species.) One reason for having the initial version of the monograph due prior to departure for Ecuador is so that the student will have developed a knowledge base that can then be modified or amplified in response to what is observed and learned while visiting the actual habitat. This experience would facilitate a deeper understanding of the topic by the student. Finally, pdf files of all monographs and photographs taken during the program by members of the class will be assembled into a large “reference” file that will be distributed electronically to each participant.

4. The ‘Grinnell System’ is an effective way of improving field observations through the personal discipline involved in the collection and recording of field notes. This technique needs to be practiced before leaving on the trip so that it can be used and applied to note-taking during the program.

C. Methods and Criteria

1. Students will be given instructions for their essays; the students will then be required to select relevant information from the readings and synthesize the information in light of the assignment for each essay. Essays will be graded on the basis of relevance, completeness, and effectiveness in addressing the broader concepts of the course.

2. Students will be required to develop PowerPoint presentations, complete with figures and illustrations, on their assigned topics. These presentations will require that each student organize salient details from their assigned topics and to address relevant concepts from the Learning Goals of the course. Students also will be graded on the public speaking aspects of their presentation. Members of the class and the instructor will evaluate each presentation and will provide written comments to the student as they present their topic.

3. Each monograph will be graded on the basis of thoroughness and the extent to which salient details related to the assigned topic were organized into a coherent narrative and the extent to which relevant concepts from the Learning Goals of the course were addressed. Emphasis will be placed on depth of coverage, and not simply on breadth of coverage. The use of references and the quality of the writing also will be evaluated. Suggested editorial changes and comments on the first draft of the monograph will be provided to each student in order to assist the student in improving the quality of the final draft of the monograph.

4. After a brief field observation period on campus, students will write a set of field notes using the ‘Grinnell System’ and then will prepare a field journal account from these notes. The exercise will be graded on the basis of the quality of the actual notes and how well the student adhered to the specified Grinnell format. Three such sets of observations and field notes will be completed during the semester.

IV. Learning Activities

A. Summary of Learning Activities

1. Classroom lectures and handouts of relevant information. Lectures on cross-cultural training and preparations for the abroad experience will be facilitated by staff from the Center for Global Engagement.)

2. Completion of outside readings (*Origin of Species*, *The Beak of the Finch*, research articles, and natural history guides to the Galápagos), followed by in-class discussions. (These readings and discussions will provide foundation material for observations and discoveries made by each student during the trip.)

3. Primary research articles, textbooks, and other scholarly works retrieved by the student on his/her assigned topic. (These resources will provide information used to understand and appreciate observations made during the travel program and will be used in writing the monograph.)

4. Preparation and delivery of a student-prepared oral report on each student’s assigned topic. (The presentation will provide the student with experience in making a presentation, will further develop

the student's understanding of the content material, and will provide background information for observations and discoveries made by students during the trip.)

5. Practice using the 'Grinnell System' in short observational exercises. (This will enable the student to learn the Grinnell system and improve the quality of their field notes during the trip, which ultimately will improve the quality of observations made by the student.)

6. On-line "Spanish of the Week" tutorials. (These will serve to develop some facility in basic Spanish phrases that students will need to navigate through their Ecuadorian experience.)

7. Creation of an illustrated monograph on each student's assigned topic.

B. Rationale

The primary purpose of this course is to prepare students to maximize their appreciation of the details of their faculty-led travel program. Thus, the learning activities are designed to disseminate information needed for a successful (and safe) trip, to provide basic background information about what students will observe while on the Galápagos Islands and in Ecuador and to provide the conceptual framework necessary to fully appreciate these details, and to facilitate team building among participants.

V. Course Grading:

Essays	50
Oral presentation on assigned topic	50
Exercises, quizzes, homework (eg. Grinnell System ex.)	25
Participation in class discussions	25
<u>Monograph</u>	<u>100</u>
Total	250

Note: Failure to provide requested information, complete necessary forms, or meet all pre-trip requirements in a timely manner could result in a penalty of up to 25 points. Therefore, students are urged to comply with requests from the instructor.

Individual exams will be curved. Your final grade is based on total number of points earned during the semester, using the following grading scale. The final grade is not curved.

A	93.4-100	B-	80.0-83.3	D+	66.7-69.9
A-	90.0-93.3	C+	76.7-79.9	D	60.0-66.6
B+	86.7-89.9	C	73.4-76.6	F	< 60.0
B	83.4-86.6	C-	70.0-73.3		

Each student will receive an IP grade for the course until the Summer Session I abroad experience has been completed and the final draft of the student's monograph has been submitted.

VI. Additional Details:

1. **Cooperative learning:** Student contributions to the class are essential to the success of the experience. Each Student brings different backgrounds and experiences, which make each student a unique educational resource. Students should feel free to ask questions; other students are expected to be respectful of students who are asking questions and to be helpful in assisting other students learn or understand material. Important components of the learning experience will be asking questions, sharing observations with the class, and listening to what the instructor, naturalists, and classmates have to say.

2. **Academic Integrity.** Science is a collaborative process. Therefore, students are encouraged to work together both to complete the assigned work and to learn material. *However, when it comes to writing*

essays, field notes, or the monograph, each student must do his/her own work independently. In addition, where information included in the monograph is derived from a print or on-line source, proper citation must be given. Students should avoid use of direct quotes, and should paraphrase all details obtained from sources. (Consult the TCNJ Academic Integrity Policy regarding consequences for submitting the work of others as your own (i.e., plagiarism): <http://policies.tcnj.edu/policies/digest.php?docId=9394>).

3. Students with Differing Abilities. I will adhere to TCNJ's Americans with Disabilities Act (ADA) policy (<http://differingabilities.pages.tcnj.edu>) and to TCNJ's Americans with Disabilities Act (ADA) policy (<http://policies.tcnj.edu/policies/digest.php?docId=8082>). However, the following information comes directly from the tour company for the cruise: "Passengers able to walk a few hours a day unassisted will be able to fully enjoy the Galápagos. Some of the excursions require more physical activity than others and involve short steep climbs or long walks in hot weather. However, most excursions require moderate activity and the walks are at a leisurely pace. Entering and exiting the *pangas* (local word for 'zodiac raft') require that you need to be reasonably fit and sure footed." The conditions encountered in Ecuador are beyond the control of TCNJ; students concerned about these requirements should consult with the faculty member leading the program or the TCNJ Center for Global Engagement.

4. Attendance. Students are expected to attend every class meeting. One cannot earn class participation points if one is absent. Students who will be absent must contact Dr. Lovett as soon as possible, but not later than 24 hours after the absence. The TCNJ attendance policy will be adhered to (<http://policies.tcnj.edu/policies/digest.php?docId=9134>).

5. Late Assignments. No credit will be given for homework assignments that are completed late. Major assignments are subject to a **10% late penalty** for not being submitted on time. Assignments will not be accepted after two weeks past the original deadline and will be given a grade of zero. See also the note regarding timely responses to requests for information under Course Grading (above).

6. Exams. Please note dates of lecture exams (in-class essays) on Syllabus. Dates are not subject to change. Review also TCNJ's final examination policy: <http://policies.tcnj.edu/policies/digest.php?docId=9136>

7. Communication. TCNJ e-mail and Canvas are the primary means of communicating information to students in the course. It is the responsibility of each student to check e-mail regularly (at least once daily). Students contacting the instructor may expect a response to their e-mails or phone messages within 24 hours of the message being delivered (on weekends or over breaks, response will be given within 24 hours of the next day of classes).

8. Recording classes. You must seek approval from the instructor to record classroom sessions. Any permitted recordings made should be for personal use only and may not be shared with others.

9. Use of 4th Hour. In this class, the deep learning outcomes associated with TCNJ's 4th hour are accomplished by a series of rigorous educational assignments that extend beyond the typical scheduled class time. These include activities conducted during the Faculty-Led Program.

10. The College of New Jersey Policy Prohibiting Discrimination in the Workplace/Educational Environment governs the college's commitment to and expectations of having an environment that respects the diversity of all members of the campus community. The link to this policy is: <http://policies.tcnj.edu/policies/digest.php?docId=9122>). Under this policy, forms of discrimination or harassment based upon specific protected categories are prohibited and will not be tolerated. If you wish to report a concern, please contact Kerri Thompson Tillett, Chief Diversity Officer, at 771-3139, or via email at thomsok@tcnj.edu.

Course Outline
BIO 365/ HON 365/ IDS 365
The Natural History of the Galápagos Islands and Ecuador I
2017

<u>Date</u>	<u>Topic/Activity</u>
Sun Jan 22	Course introduction. Getting to know members of the class. Overview of the specific destinations visited during the trip. Watch video about Galápagos.
Mon Jan 23	Geography of Ecuador and the Galápagos Islands. <i>Voyage of the Beagle</i> , Chapter 19. Sign up for individual topics for the semester.
Thur Jan 26	Evolution and Natural Selection. (Map quiz at start of class) <i>Spanish of the Week</i> , Lessons 1-3
Mon Jan 30	Populations, Speciation, Adaptive Radiation, Endemism. <i>Spanish of the Week</i> , Lesson 4
Thur Feb 2	<i>Beak of the Finch</i> , Chapters 2, 3 (pg 37-42), 4 (pg 47-53). 10 (pg) <i>Origin of Species</i> , Chapter 2 (Make rooming assignments. Final Payment for trip Due Feb 6!)
Mon Feb 6	<i>Origin of Species</i> , Chapters 3, 4, 6. <i>Spanish of the Week</i> , Lesson 5
Thur Feb 9	<i>Origin of Species</i> , Chapters 11, 12, 14.
Mon Feb 13	In-class essay on evolution and the <i>Origin of Species</i> .
Thur Feb 16	<i>Beak of the Finch</i> , Chapters 1, 3 (pg 42-46), 4 (pg 53-69), 5-7. (Project outlines & bibliographies due on Canvas.)
Mon Feb 20	<i>Beak of the Finch</i> , Chapters 8-14 (Schedule individual meetings w/ instructor to discuss research project outlines.)
Thur Feb 23	<i>Beak of the Finch</i> , Chapters 15-Epilogue.
Mon Feb 27	Evo-devo: Recent studies on Galápagos finches.
Thur Mar 2	In-class essay on Galápagos finches.
Mon Mar 6	History of Ecuador: The Incan empire and pre-colonial Ecuador, invasion by the Spanish, thru the modern era. <u>Outline of research paper and citations due.</u>
Thur Mar 9	How to write field notes using the Grinnell System.

- Mar 11- 19 *Spring Break*
- Mon Mar 20 Field Observations for first Grinnell assignment.
Grinnell field journal assignment due on Tues, Mar 21.
- Thur Mar 23 Student Presentations: a, b, c
- Mon Mar 27 Student Presentations: d, e₁, e₂
- Thur Mar 30 Student Presentations: f₁, f₂, g
- Mon Apr 3 Student Presentations: h, i, j
- Thur Apr 6 Student Presentations: k, l, m
- Mon Apr 10 Student Presentations: n, o, p
- Thur Apr 13 Binoculars training. Make second set of field observations.
Spanish of the Week, Lessons 6 & 7
- Mon Apr 17 Salsa Lessons.
(Second Grinnell field journal assignment due.)
- Thur Apr 20 Details about preparing for the trip. First version of research paper due.
Spanish of the Week, Lessons 8 & 9
- Mon Apr 24 Preparing “Personal Story” to share with host family.
Spanish of the Week, Lessons 10 & 11
- Thur Apr 27 Make third set of field observations.
- Mon May 1 (Third Grinnell field journal assignment due.)
- Thur May 4 Course wrap-up.
- Final Exam period. Use this time to revise your research paper.

**Please note: Dates are subject to change.