Comparative Tropical Ecology  
ENVI-3005 (3 Credits / 45 class hours) 
SIT Study Abroad Program: 
Ecuador: Comparative Ecology and Conservation

PLEASE NOTE: This syllabus represents a recent semester. Because courses develop and change over time to take advantage of unique learning opportunities, actual course content varies from semester to semester.

Course Description
The Comparative Tropical Ecology seminar focuses on the ecological and biological dynamics of Ecuador’s ecosystems, emphasizing the most relevant biotic and abiotic elements in each environment. The course covers ecological interactions, biodiversity, bio-indicator organisms, evolutionary processes, and use of biodiversity indexes. The roles and adaptations of the major biological organisms such as plants, insects, birds, and mammals of Ecuador are also examined. Comparative analyses are made among a diversity of ecosystems and locations, including cloud forest, sub-alpine Páramo, Amazon tropical rainforest, and the Galápagos Islands.

Learning outcomes
By the end of the course students will be able to:
- Describe the prominent features of the ecosystems studied, including soil structure, vegetation dynamics, geomorphology, and microclimate.
- Classify the most significant group species in Ecuador, particularly in terms of plants, insects, birds, and mammals.
- Articulate the relevance of Ecuadorian ecosystems and their biological importance to Northwest South America and the Neotropics.
- Discuss the relevance of key bio-indicator organisms, biodiversity indexes, population structure studies, and other biological analyses.
- Identify the most relevant evolutionary features shown by co-evolutionary biological groups, such as plants and insects.

Language of Instruction
The academic content of this course is taught predominantly in Spanish; all orientation and logistical issues are provided in English.

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Course Schedule

Module 1: Ecuador’s General Ecology and Introduction to Cloud Forest Ecology
This module includes an overview of the most important ecosystems of Ecuador with special emphasis on cloud forests. Analyses of these ecosystems include their principle ecological dynamics as well as discussion of historical events influencing Ecuador’s ecological realm. This module also includes an introduction to cloud forest ecology. Fieldwork and activities are carried out in the cloud forest.

Session 1: Ecosystems of Ecuador: Introduction to the most important ecosystems in Ecuador and their main biotic and abiotic characteristics.

Required Reading:

Session 2: Ecology and History of Ecuador: Ecuador’s ecological timeline and an ecological analysis of the most important historical events determining the current ecological reality of Ecuador.


Required Readings:

Session 4: Introduction to Hummingbirds and their Natural History – Yanacocha Reserve

Field Reference:

Session 5: Botany Field Studies in Cloud Forest: Field botany, main systematics, field analysis, and applications (provided in several sub-sessions during the cloud forest excursion).

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Field References:


Session 6: Ornithology Field Studies in Cloud Forest: Field analysis, main systematics, and applications (provided in several sub-sessions during the cloud forest excursion).

Field Reference:


Session 7: Entomology Field Studies in Cloud Forest: Field analysis, main systematics, applications (provided in several sub-sessions during the Cloud Forest excursion).

Field References:


Assignment during Module 1:

- Conduct Cloud Forest Section of Field Notebook

Module 2: Páramo Highlands

This module includes the study of the main ecological, biological, and evolutionary features of the Andean Páramo, including the most interesting adaptations and strategies for survival in extreme environments.

Session 1: Páramo Workshop: Ecosystem dynamics of the Páramo: geological origin; biological adaptations to high altitude; ecological structure; botanical composition; and ecological threats (the workshop includes a lecture, group analysis in four working groups of students, and a plenary session).

Required Reading:


Session 2: Botany Field Studies in the Páramo: Main adaptations of plants to high altitude; plant structures; systematics (provided in several sub-sessions along the Páramo excursion).

Field References:

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**Session 3: Ornithology Field Studies in the Páramo**: Andean bird species, including key species, such as the Andean Condor and Black-faced Ibis (provided in several sub-sessions along the Páramo excursion).

**Field Reference:**

**Session 4: Mammals of the Ecuadorian Páramo**: Introduction to the principle mammal species in the Páramo and their biological adaptations: Andean Bear, Andean Fox, Andean Deer, Camelids, and others.

**Field References:**

**Assignments during Module 2:**
• Conduct Páramo section of Field Notebook
• Conduct Paramo Section of Comparative Investigation Project for Research Methods and Ethics course

**Module 3: Ecosystems of the Galápagos Islands**
The Galápagos module provides an introduction to the study of the geology, oceanography, biology, and land ecosystems of the Galápagos archipelago. The most important evolutionary features of the archipelago are analyzed.

**Session 1: Galápagos Workshop**: Introduction to Galápagos ecology; geology; Galápagos oceanography; principle ecosystems and life zones; evolution; endemism; and ecological issues (the workshop includes a lecture, then group analysis in four working groups of students, and a plenary session).

**Required Readings:**

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Session 2: Botany Field Studies in Galápagos: Native, endemic, and introduced species; tropical dry forest plants and adaptations (provided in several sub-sessions during the Galápagos excursion).

Field References:

Session 3: Ornithology Field Studies in Galápagos: Native, endemic, introduced species, and evolutionary adaptations of birds of the Galápagos (provided in several sub-sessions during the Galápagos excursion).

Field References:

Session 4: Reef Fish and Other Marine Life in Galápagos: Study of the principle marine ecosystems of the Galápagos, including organism identification and adaptation (provided in several sub-sessions during the Galápagos excursion).

Field References:

Assignments during Module 3:
• Conduct Galápagos Section of Field Notebook
• Conduct Galapagos Section of Comparative Investigation Project for Research Methods and Ethics course

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Module 4: Amazon Rainforest Ecology

This module focuses on the main ecological and biological aspects of the Ecuadorian Amazon Rainforest, including the study of the most important biotic and abiotic elements encountered in Amazonia in general.

Session 1: Amazon Workshop: Introduction to Amazon ecology; geological origin; Amazon soils; hydrology; forest structure; main ecosystems and ecological issues (the workshop includes a lecture, then group analysis in 4 working groups of students, and a plenary session).

Required Reading:

Session 2: Botany Field Studies in the Amazon: Forest strata, lianas, medicinal and useful plants, systematics (provided in several sub-sessions during the Amazon excursion).

Field References:

Session 3: Pollination and Seed Dispersal in the Amazon: Pollination and seed dispersal strategies in the Amazon – field instruction and practice.

Field References:

Session 4: Ornithology Field Studies in the Amazon: Field analysis, systematics, and applications of Amazonian birds (provided in several sub-sessions during the Amazon excursion).

Field Reference:

Session 5: Entomology Field Studies in the Amazon: Field analysis, systematics, applications of insects of the Amazon (provided in several sub-sessions during the Amazon excursion).

Field References:

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**Session 6: The Great American Interchange:** Paleontology, mammal species interchange between North and South America lecture.

**Field Reference:**

**Session 7: Mammal Field Studies in the Amazon:** Primates and Chiroptera: field investigation and main characteristics (provided in several sub-sessions during the Amazon excursion).

**Field References:**

**Session 8: Fish Field Studies in the Amazon:** Analysis of the predominant fish species in the Ecuadorian Amazon Basin and their ecology.

**Assignments during Module 4:**
• Conduct Amazon Section of Field Notebook
• Conduct Amazon Section of Comparative Investigation Project for Research Methods and Ethics course

**Session 9: Ecology Article Analysis Student Presentation**

**Session 10: Final Exam of Comparative Tropical Ecology course**

**Evaluation and Grading Criteria**

**Assignments:**
• **Readings:** Readings will be distributed to students during orientation week. Readings are organized by ecosystems: Ecuador General; Galápagos/Coast; Cloud Forest/ Páramo; and Amazon. The readings are designed to complement and expand upon the information covered by lectures, offering different points of view as well as more in-depth discussion of the topics. There are separate reading packets available on flash and hardcopy. Readings should be properly cited in all assignments.
• **Ecology/Biology Article Analysis** This assignment consists of a short report (2 to 3 pages single space) including the analysis of a science article in the fields of ecology and/or biology. Students should provide their own arguments and include support materials, such as citations of other science articles. Students choose one of the following required articles for the analysis:

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- **Field Notebook** This assignment is composed by the ecological and biological field reports on the ecosystems visited during the semester. The Field Notebook contains ecological, biological, conservation, and sustainability observation gained on your own in the field, and includes information from a wide variety of field sources, such as guided sessions during excursions, field activities and direct observations at hikes.

- **Final Exam** The final examination contains questions from all lectures & field activities, as well as selected required articles that will be indicated by the director.

- **Participation** Participation is assessed based on:
  - Preparation, attendance, and attitude in all lectures, discussions, activities, and excursions.
  - Active contribution to periodic group meetings.
  - Completion of written assignments.
  - Completion of assigned readings.
  - Culturally respectful behavior, flexibility, punctuality, and enthusiasm.

**Assessment:**

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<tr>
<td>Ecology Article Analysis Report</td>
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<td>Field Notebook</td>
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<td>Final Exam</td>
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<td>Participation</td>
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**Grading Scale:**

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Expectations and Policies
- **Readings** Students are responsible for all readings, and should be prepared to bring them to bear during program activities. The readings aim to help students place the classes in their context, to engage lecturers, to generate questions for class discussions, and to deepen student knowledge of particular topics.
- **Assignments** Timely completion of all assignments is expected. Late hand-ins will be penalized. All assignments are evaluated according to organization, analytical quality, depth of understanding, argumentation, and presentation of evidence.

Please refer to the SIT Study Abroad handbook for policies on academic integrity, ethics, warning and probation, diversity and disability, sexual harassment, and the academic appeals process.

Class Meetings:
Experimento de Convivencia Internacional
Calle Hernando de la Cruz N31-37 y Mariana de Jesús
Tel. 222-95-96
SIT Office: First Floor; AD: Dr. Xavier Silva

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