



The Galapagos Academic Institute for the Arts and Sciences GAIAS

BIO-0309 ISLAND BIOGEOGRAPHY

TRACK: Evolution, Ecology, and Conservation.

Prerequisites: General Ecology or similar subjects

Professor: Juan M. Guayasamin, PhD

Course description:

Islands are among the most exciting scenarios for understanding the ecological, geographical, and evolutionary processes that shape biodiversity. Island biogeography theory explains species distributions in archipelagos, but it can also be applied to any system that behaves as an island —naturally or artificially isolated habitats/ecosystems (ocean bottom cordilleras, mountain tops, fragments of ecosystems, hosts on host-parasitic interactions, etc.).

In this course, students will receive an introduction to the field of biogeography and then will learn about the particularities of island biogeography and how to apply this theory into the context of the Galapagos. Also, students will use theoretical knowledge acquired during lectures as bases for the discussion of different case studies available in the literature, and for developing an original project or an essay to approach a research question in the realm of island biogeography. Finally, we will address how human activities affect the dynamics of species' distributions in islands.

General objective:

The main objectives of the course are:

- To develop an understanding of the historical and ecological factors that shape species' distributions, especially in island systems.
- To review the scientific theory behind biogeography, including evolution, plate tectonics, and molecular ecology.
- To understand how island biotas are responding to the changes caused by human activities.
- To understand and apply the scientific method through hands-on projects that will apply the biogeography concepts and data into a real scenario in the Galapagos Islands.

Specific objectives:

1. Understanding of concepts linked to biogeography
2. Development of critical thinking through topic discussions
3. Conception, designs, and execution of projects

Knowledge:

- Students will learn about the theory and complexity behind historic and current species' distribution pattern.

- Students will learn about the drastic modifications that humans are producing on species distribution and composition on archipelagos.
- Students will understand the process of scientific methods and hypothesis testing.

Skills:

- Students will be able to use the theoretical background as a tool to predict biogeographic patterns.
- Students will be able to design and execute projects related to biogeographic patterns.
- Students will be able critically analyze biogeographic studies.

Attitudes:

- Students will be encouraged to critically think about the biogeographic problems in Galápagos and use their creativity and knowledge to generate solutions.
- Students will be encouraged to work in groups, in order to develop the necessary skills and attitudes that lead to successful collaborations.

Course content:

- Scientific theory behind island biogeography.
- Examples of species' distribution patterns on island systems.
- Effect of human activities on island biogeography.
- Formulation, design, and execution of research project.

Class format:

Students will attend short lectures and read previously assigned materials before coming to class. Article discussions will focus on examples addressing different, but complementary aspects of biogeographic studies. The most important part of this course will be spent working in small groups, and gathering information for the development of biogeographic projects.

Brief description of assignments and course work:

1. **Article discussions:** each student will lead the discussion of one or more research articles, highlighting the main contributions, applications, and potential flaws.
2. **Research project:** students will formulate and execute a short research project. Specific instructions will be provided during the course.
3. **Final exam:** the exam will cover the fundamental concepts reviewed in class.

Grading:

- ✓ Attendance and class participation 15%
- ✓ Paper discussions 25%
- ✓ Exercises 25%
- ✓ Research project 25%
- ✓ Final Exam 25%

Scale: A=100-91, B=90-81, C=80-71, D=70-61, F=<