

**UNIVERSIDAD DE COSTA RICA
ESCUELA DE BIOLOGIA
TROPICAL BIOLOGY STUDY ABROAD PROGRAM FOR KU STUDENTS**

COSTA RICAN NATURAL HISTORY

OBJECTIVES

- € To learn to recognize common Neotropical organisms in the field
- € To understand the biology of these organisms, especially their ecology and evolution
- € To appreciate the diversity of tropical life and the current status of our attempts to understand it

DESCRIPTION

This course consists of four hours of class per week and two field trips for three to four days each. Class time consists mostly of lectures but also includes guided walks around campus in order to learn the local flora and fauna. Field trips include guided walks, discussions about the notable biological aspects of the site, and field projects designed to answer specific questions. Because of the incredible biodiversity present in the tropics this course must necessarily focus on a few key groups of organisms, namely, flowering plants, arthropods and vertebrates. Within these general groups the criteria used for inclusion in the course include: prevalence, ecological importance, and ease of identification. The goal is to identify selected taxa in the field and achieve a general understanding of their life cycle, ecology and evolution. The course is organized taxonomically but the content deals extensively with ecology (emphasizing interactions between organisms) and evolution. Finally, it is hoped that the student will gain an understanding of the methods used in tropical biology and the status of our current knowledge.

TEXT

The primary texts for the course are: (1) Janzen's *Costa Rican Natural History*; and (2) Kricher's *A Neotropical Companion*. Readings from other sources may be assigned on occasion and photocopies of these will be provided. For the interested student other references are recommended:

- € *Tropical Nature* (A. Forsyth & K. Miyata)
- € *The Ecotravellers' Wildlife Guide. Costa Rica.* (L. Beletsky)
- € *La Selva. Ecology and Natural History of a Neotropical Rain Forest* (L. McDade *et al.*, eds.)
- € *Monteverde. Ecology and Conservation of a Tropical Cloud Forest.* (N. Nadkarni & N. Wheelwright)
- € *A Field Guide to the Families and Genera of Woody Plants of Northwest South America* (A. Gentry)
- € *A Field Guide to the Insects* (Peterson Field Guide Series, D. Borror & R. White)
- € *A Guide to the Birds of Costa Rica* (F.G. Stiles & A. Skutch)
- € *Birds of Tropical America* (S. Hilty).

EVALUATION

The final grade is based on two partial exams (45% each) -- one on plants and plant/animal interactions, and one on animals -- and two brief reports on the results of the field projects (5% each). Exams cover assigned readings, lectures and discussions during guided walks. About 15% of the first exam consist of plant identifications.

PROGRAM

1. Differences between the tropics and the north temperate zone. Plants: species richness; strategies for replacing leaves; buttresses and stilt roots; epiphytes and lianas. Animals: eusocial insects; diversity of frogs, frugivorous birds and bats.
2. Types of plant/animal interactions: phytophagy (leaf chewers, leaf miners, stem borers, sap suckers, gall formers, etc.); leaf-cutter ants; plant defences; nonsymbiotic mutualisms (pollination and seed dispersal); symbiotic mutualisms (fig pollination, ant plants)
3. Systematics: how new species are described and classified, the phylogenetic tree of life (cladograms as hypotheses and predictive tools). The kingdoms of life. Key concepts in evolutionary biology.
4. Brief introduction to plant anatomy. Characteristics and biology of some representative plant families: Araceae, palms, Bromeliaceae, Heliconiaceae, Orchidaceae, Poaceae; Araliaceae, Asteraceae, Begoniaceae, Cecropiaceae, Clusiaceae, Ericaceae, Fabaceae (legumes), Lauraceae (avocado family), Melastomataceae, Meliaceae, Moraceae (figs), Myrtaceae, Passifloraceae (passion fruit), Piperaceae (black pepper family), Rubiaceae (coffee family), Rutaceae (citrus family), Solanaceae (potato family)
5. Fungi: Acomycetes (lichens, etc.) and Basidiomycetes (mushrooms)
6. Brief survey of the animal kingdom: principal phyla. Classes of Arthropods: Chelicerates (spiders, scorpions, mites), Crustaceans, Myriopods (centipedes and milipedes), Insects.
7. Characteristics and biology of the principal insect orders: springtails, mayflies, dragonflies, grasshoppers and katydids, stick insects, cockroaches, preying mantis, termites, Hemiptera (cicadas, aphids, etc.), beetles, Hymenoptera (wasps, ants, bees), caddisflies, moths and butterflies, flies
8. Vertebrate evolution. Principal groups of fish.
9. Amphibians: diversity of frog reproductive biology, etc.
10. Reptiles (lizards and snakes)
11. Birds: mixed species flocks, leks, migration, songs; antbirds, vultures, manakins, groove-billed ani, tinamu, motmot, quetzal, toucan, oropendola, etc.
12. Mammals: bat diversity; monkeys, sloths, tapir, agouti, peccaries, etc.