

# **.VĒRITAS**

U N I V E R S I D A D

## **CENTER FOR INTERNATIONAL PROGRAMS**

**Course name: Tropical Ecology**

**Course code: ENV 3044J**

**Total contact hours: 60 hours**

## **COURSE DESCRIPTION**

This course will provide students with a general overview of tropical ecology. Students will gain insight about basic ecological concepts and be able to explore a variety of ecosystems, their animals and the multiple and complex ecological interactions that can be found in these areas. Costa Rica is a tropical country with an immensely rich biodiversity and for this reason a very representative area to these studies. Emphasis will be given to the study of the ecosystems found in Costa Rica, but others will be discussed as well.

## **OBJECTIVES**

- 1) To become acquainted with the concepts and issues addressed to ecology.
- 2) To learn the characteristics of the major tropical ecosystems on earth.
- 3) To observe different ecosystems and seek examples of important interactions.
- 4) To become familiar with the biodiversity of the tropics.
- 5) To understand the importance of the balance and the harmony among different types of ecosystems.
- 6) To understand the natural and human made impacts on natural ecosystems.
- 7) To comprehend the importance of conservation and management of natural systems.

## **COURSE PRE-REQUISITES**

It is recommended, but not required, that students complete a basic biology course prior to entering this course

## **COURSE CONTENTS**

### **UNIT 1. ECOLOGY: BASIC CONCEPTS.**

1. Ecology as a science
  - Organisms and their environment
  - Conditions
  - Resources
2. Ecosystem components
  - Biotic and abiotic elements
  - Organization of the biotic components
  - Species, Populations and Communities
  - Biotic interactions
3. Matter and energy flow
  - Thermodynamic laws
  - Entropy and life
4. Trophic Levels
  - Food chains and food webs
  - Nutrient and water cycles

### **UNIT 2. TROPICAL TERRESTRIAL ECOLOGY**

1. Physical Conditions
  - Climate of the Neotropical Region
  - Biogeography of the Central American Isthmus
  - Geography and Climate of Costa Rica
  - Tropical Biodiversity
2. Plant Ecology
  - Forest structure
  - Maintenance of plant diversity
  - Seasonal rhythms in flowering, fruiting, germination
  - Pollination systems
  - Tropical plants
3. Animal Ecology
  - Tropical animals
  - Herbivory: impact on plant defenses
  - Seed dispersal and seed predation
  - Defense against predation
  - Diapause and migration

### **UNIT 3. TROPICAL TERRESTRIAL ECOSYSTEMS**

1. Rain Forests
2. Dry Forests

3. Montane Forests
4. Paramus
5. Savannas
6. Deserts
7. Mangroves

#### **UNIT 4. INTRODUCTION TO TROPICAL MARINE ECOLOGY**

1. Marine Ecology
  - Ocean life zones (division of marine environments)
  - Energy transfers in marine environments
  - Plankton Ecology
  - Productivity and production
  - Herbivores (grazing), planktivores, Piscivores, Carnivores

#### **UNIT 5. ANTHROPOGENIC INTERVENTION**

1. Natural and Human Impacts on Coastal Ecosystems
2. Indigenous populations and forest use
3. Value of tropical forests, development and conservation
4. Causes of tropical deforestation
5. Consequences of forest destruction, forest fragmentation and conservation

#### **METHODOLOGY**

##### **Attendance**

Students are only allowed 2 absences (justified or not). The student will fail the course if he/she has more than 2 absences. Students will have a 0 on any assignment evaluated in class (presentations, evaluations, field trips, etc.) if he/she is absent in this class, unless an official document is presented to justify the absence the class after the absence. In this case the assignment will be done this day. **An unjustified absence to a fieldtrip will immediately mean failing the course.** You can only have two total absences in your elective.

##### **Behavior**

It is expected that students behave as adults both in class and fieldtrips. Respect your peers is the key

##### **Electronic devices:**

The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. **Please turn all devices OFF and put them away when class begins.** Devices may be used ONLY when the professor

assigns a specific activity and allows the use of devices for internet search or recording. Those who fail to comply with the rule must leave the classroom for the remainder of the class period.

## **Assignments**

### **For all Written Assignments**

All written assignments will be uploaded to Moodle. All assignments will have a deadline to be sent, and **will not be received after this deadline, without exceptions**. It is each student's responsibility to be aware of the deadline (shown on Moodle for each assignment).

Should be no less than two 1.5-spaced pages (not including images) with #12 Times New Roman font, in letter size pages.

### **For All Presentations:**

It will be evaluated based on preparation (knowledge assimilation), presentation style (organization, smoothness, and clarity), slides (clarity, aesthetics), finishing the presentation in time, and answering questions. All presentations must be made on the assigned date, if not the grade will be 0 (unless the absence is justified).

### **Individual Presentation**

Students will have to make an individual presentation (power point) through the course. The presentation must be about any subject concerning tropical ecology, approved by the professor. It must last about 15-20 min and **should be emailed to the professor 2 days before**. Presentations will be held last week of classes, depending on the amount of students taking the course. The class will assign 20% of the grade and the professor will assign the remaining 70%.

### **Group Lab Report**

For the report each group will have a practice provided by the teacher, each group should make sure all activities are done and on time. The last 15 minutes are for cleaning laboratory equipment and accommodation. One grade will be assigned for the group as a whole.

### **Article discussions:**

For each lecture assigned, there will be a group discussion of it (each student will be in charge of leading at least one discussion).

### **Fieldtrip Grade**

Students will carry small notebooks to write down interesting information during the field. Each person's journal will be unique, not only in that you will each notice different things, but you will each interpret similar things differently. This journal will help the students write their fieldtrip report, which is a formal paper of your journal information.

The field trip report contains information of what the student sees and learns in the fieldtrip.

### **Fieldtrips**

This course includes two **mandatory** Field Trips: (choices will depend on climate and animal activity). Lodging and main meals are covered by the course.

The mandatory fieldtrips in this course are not excursions. Only students enrolled in this course may attend. Field work may include late night species monitoring, long walks on beaches or dense vegetation areas and other tasks that might be considered harsh or strenuous for students who have not taken an environmental science course or have not done fieldwork. Students must be on time for all fieldtrip related activities.

### **EVALUATION SYSTEM**

Individual Presentation	20%
Attendance and Participation	10%
Midterm Test (Units 1 and 2)	20%
Final Test (Units 3 to 5)	20%
Articles Discussions (Quizzes)	10%
Field trip 1	10%
Field trip 2	10%

## **BIBLIOGRAPHY**

- Begon, M., J. Harper & C. Townsend. 1999. *Ecology*. 3<sup>rd</sup> ed. Blackwell Science, Oxford, U.K. 1068p.
- Nibakken, J.W. & M.D. Bertness. 2005. *Marine Biology: An Ecological Approach*. 6<sup>th</sup> ed. Benjamin Cummings, San Francisco, 579p.
- Janzen, H.D. 1983. *Costa Rican Natural History*. The University of Chicago Press. 789p.
- Kricher, J. 1997. *A Neotropical Companion: An Introduction to the Animals, Plants, and Ecosystems of the New World Tropics*. 2<sup>nd</sup> ed. Princeton University Press, Princeton, NJ.
- Stiles, G.F. & Skutch A. 2007. *Guía de aves de Costa Rica*. 4ta. edición Trad. L. Roselli, illus. D. Garner. Instituto Nacional de Biodiversidad, Heredia, Costa Rica. 576 pp.
- Savage, Jay M. 2002. *The Amphibians and Reptiles of Costa Rica*. The University of Chicago Press.
- Reid, F. *A Field Guide to the Mammals of Central America and Southeast Mexico*