

NATIONAL UNIVERSITY OF COSTA RICA
Faculty of Sciences of the Earth and the Sea
Department of Environmental Sciences

Program 2017¹

Class name:	Ecology and Sustainable Development in Costa Rica
Code of class:	AMD 451 O
Credits:	3 Credits
Period offered:	Fall and spring
Length:	Cycles of 17 weeks
Type of course:	Elective, Co-taught
Nature of the course:	Theoretical and practical
Hours per week:	Theory: 2, practice: 1, fieldtrip: 3, independent work: 2, Total hours per week: 8
Number of fieldtrips:	3
Requirements:	None
Class schedule:	Wednesday 1:30-4pm
Office hours for students:	By appointment
Guest instructors:	M.Sc. Gustavo Vargas, Dr. Sergio A. Molina Murillo
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DESCRIPTION

This optional course is offered to students of the School of Environmental Sciences and to American students in the context of the IFSA-Butler program, in order to promote a more comprehensive training with international perspectives for analysis and discussion. The course will be co-taught in Spanish language and the Spanish syllabus is the program contract. Although the course devotes part of the time to the deepening of theoretical content, it also gives an important place to practical development through the completion of fieldtrips.

Costa Rica has a significant percentage of its territory under some category of protection, which has also increased due to the private reserves dedicated to ecotourism and research. A challenge for society is to raise awareness to conserve these natural resources in the long-term, where the knowledge inventories and their valuation by society, are necessary and urgent. The course will

^{1 1} The course is to be delivered in Spanish. The syllabus in Spanish is the official one and this English version is included to aid English speakers.

address aspects of the history of ecology, as well as conceptual components of the ecosystems and the ways they interact in the environment. This requires an approach to ecology as interdisciplinary science enabling understanding of its importance in the recovery, preservation and protection of the environment.

The course includes the development of a practical assignment by students, which helps to put into practice the concepts and skills developed in the course. Students are organized according to their interests, although they will follow the standards established under this program and other instruments that will be provided later. Through this process, we hope to achieve the following objectives:

STUDENT LEARNING OBJECTIVES

GENERAL OBJECTIVE

- To familiarize students with the tropical ecosystems, their importance, functionality and interrelationship with sustainable development in Costa Rica and the global society.

SPECIFIC OBJECTIVES

- To contribute to the understanding of the ecological principles that govern tropical ecosystems.
- To expand the domain of the theoretical foundations of ecology as a science aimed at the conservation and sustainable use of natural resources in Costa Rica.
- To familiarize students with the socio-economic, political, and environmental conditions of Costa Rica and how these conditions promote or prevent sustainable use of ecosystem goods and services.

TOPICAL CONTENTS

I. Concept of ecosystem

- Chains, networks and ecological pyramids
- Cycle of matter and biogeochemical cycles
- Interspecific relations: competition and coexistence, predation, commensalism, cooperation and mutualism.
- Plant-animal interactions: plants and microorganisms, phytophagous, and direct and indirect defenses of plants, ecology of pollination and dispersal.

II. Tropical ecosystems

- Abiotic component: Geology and climate
- Dynamics of tropical ecological systems: Dynamics of the forest, phenological, ecological succession patterns
- Tropical biomes: Holdridge Life zones
- Tropical biogeography

- Tropical forests and climate change

III. Ecological resources in Costa Rica

- Basic concepts: natural resources and biological diversity
- Types of vegetation and its associated fauna: composition, dominance, stratification and evolutionary adaptations
- Populations of plants and animals threatened with extinction, fragmentation of habitat, endemism, contemporary human influence

IV. Historical and current socio-economic and environmental situation of Costa Rica

- Globalization and socio-economic transition from Costa Rica
- Social, economic, and environmental challenges currently
- Socio-economics of climate change

V. Protected areas for the conservation of biodiversity

- Protected areas management categories
- The national system of conservation areas: concept and organization
- Private booking system
- Social participation in the management of protected areas: local experiences

VI. Use of ecosystem services in Costa Rica

- Relationship of the human being and the ecosystem
- Scientific interest: biological stations, reserves and Botanic Gardens
- Recreation: tourism and ecotourism
- Legal principles, norms and institutions that safeguard the ecological wealth
- Program of Payment for Environmental Services

PEDAGOGICAL STRATEGY

The teaching team facilitates the learning process, enabling students to be engaged participants in the different activities. The course will be co-taught where facilitators organize, coordinate, and evaluate the course in a shared manner. With the use of creative strategies, **the teaching team promotes moments of reflection**, analysis, criticism and reasoning for the construction of meaningful learning. In this way, the student must participate in investigating, providing, analyzing, and generating feedback from the process of teaching and learning, with the teaching staff and their partners.

- This course will be offered in Spanish. The analysis of readings will be mostly in Spanish, and occasionally in English. There will also group activities, discussion of videos and readings related to the topics covered in the course.
- Lectures by teacher or guests are intended to guide the discussions and support the course content and objectives.
- There will be four fieldtrips to experience aspects related to the topics covered in the classroom and to learn about projects and experiences.

- The students must perform a final practical project from a short list of topics at the beginning of the session. This project must be presented in written and oral form.

EVALUATION

General course evaluation criteria:

Activity	Assignment
Analysis of 4 readings <i>-2.5% each</i>	10%
Examination I	15%
Examination II	15%
Reports of fieldtrips <i>-5% each</i>	15%
Research report <i>-Logging book: 5%</i> <i>-Proposal: 10%</i> <i>-Final report: 10%</i> <i>-Oral presentation: 5%</i>	30%
Attendance and participation	15%
Total	100%

The following table is used for rounding the final grade. Note that a minimum of 7.0 is required to pass the class.

EVALUATION SCALE		
From 0.10 to 0.24, corresponds to 0.25	E.g. 7.22	Rounding 7.25
From 0.26 to 0.49, corresponds to 0.50	E.g. 8.28	Rounding 8.50
From 0.51 to 0.74, corresponds to 0.75	E.g. 8.53	Rounding 8.75
From 0.76 to 0.99, corresponds to the upper	E.g. 9.76	Rounding 10

Reading analyses: Readings will be evaluated with quizzes, discussions in class or any other means which is determined by the instructor. This involves reading materials for each session with sufficient detail to be able to ask penetrating questions and participate in intelligent discussions on the key issues.

Examinations: There will be two short examinations on the basis of the topics covered in the lectures, readings and field experiences. Requested corrections to the grading of these

examinations should be made within 24 hours of the exam's return to the student. Corrections requested after this time will not be taken into consideration.

Reports of fieldtrips: Students will present a report for each fieldtrip. Each student must participate in scheduled fieldtrips and submit a single report (**printed, two-page maximum**) the following week, which summarizes their experiences and most significant learning. Hand-written reports will not be accepted. Reports will not be accepted after the due date.

Scheduled of fieldtrips *

Location	Purpose	Date
Cerro de la Muerte	Introduction to the concepts of ecosystem	1 day: Saturday Aug. 26 th
Sarapiquí	Learn and understand the dynamics of tropical ecosystems	2 days: Friday and Saturday Sep 16-17 th
Poas Volcano National Park	Explore a protected area, its managerial challenges for tourism and neighboring communities	1 day: Wednesday: Oct 21 st

* The University only covers transportation. Students pay for food and lodging. *For reasons beyond control, fieldtrips could be cancelled, rescheduled to another date, or may take place on the same date in another location.*

Research/Practical project: A specific guide for this project will be handed during the first week of class.

Attendance and participation: fieldtrips and class attendance is mandatory. After two unexcused absences in class, or an unexcused fieldtrip, students will be withdrawn from the course. In terms of participation, all students should come prepared for each session.

SCHEDULE AND PLANNING OF ACTIVITIES

Week	Theme	Chapter	Activities	Supporting materials
1 26 Jul.	Presentation program Introduction to concepts of ecosystem	I	Presentation of program Presentation of professor Lecture and discussion	Course outline Class notes
02 August: National Holiday (no class)				
2 09 Aug.	Ecological inter-specific interactions	I	Lecture and discussion Analysis of reading 1	Class notes Multimedia Reading 1: Montagnini, Florencia & Jordan, C. 2002. <i>Reciclaje de nutrientes</i> . In: Guariguata, M. & Kattan, G. <i>Ecología y Conservación de Bosques Neotropicales</i> .p:167-191.
	Ecology and plant-animal relations		Lecture and discussion Fieldtrip 1	Class notes Guide for fieldtrip report
3 16 Aug.	Tropical ecosystems abiotic components	II	Lecture and discussion	Class notes
4 23 Aug.	Tropical biomes and life zones	II	Analysis of reading 2	Reading 2: Adler, G. 2002. <i>La regulación de las poblaciones de mamíferos</i> . In: Guariguata, M. & Kattan, G. <i>Ecología y Conservación de Bosques Neotropicales</i> .p:329-343.
5 30 Ago.	Tropical ecosystems and the influence of climate change	II	Lecture and discussion Fieldtrip 2	Class notes Guide for fieldtrip report
6 06 Set.	Ecological resources in Costa Rica	III	Case study and discussion	Multimedia Case study
7 13 Set.	Presentation of Project drafts			
8 20 Set.	Examination I			
9 27 Set.	Globalization and socio-economic transition from Costa Rica.	IV	Presentation of the Professor Lecture and discussion	Class notes Reading

Week	Theme	Chapter	Activities	Supporting materials
10 04 Oct.	Social, economic, and environmental challenges currently	IV	Case study: socio-economics of climate change Analysis of reading 3	Multimedia Case study Reading 3: Myers, CM. 2001. <i>Economic development policy and the protected areas system in Costa Rica: A historical review and prospects for the future.</i> Vida Silvestre Neotropical 10 (1-2), 3-19.
11 11 Oct.	Protected areas management categories The national system of conservation areas: concept and organization	V	Lecture and discussion	Class notes Reading
12 18 Oct.	Social participation in the management of protected areas: local experiences	V	Field trip 3 Class presentation	Class notes Guide for fieldtrip report
13 25 Oct.	Relationship of the human being and the ecosystem: uses and threats	VI	Lecture and discussion Analysis of reading 4	Class notes Reading #4: Wunder, S. 2006. <i>Pagos por servicios ambientales: Principios básicos esenciales.</i> Español: http://www.cifor.org/publications/pdf_files/OccPapers/OP-42S.pdf English: http://www.cifor.org/publications/pdf_files/OccPapers/OP-42.pdf
14 01 Nov.	System of payment for environmental services: case studies	VI	Special guest and discussion	Multimedia
15 08 Nov.	Examination II			
16 15 Nov.	Final report		Students submit and present final report	
29 Nov.	Extraordinary examination			

RULES GOVERNING THE COURSE

- **For purposes of this course, attendance at all classes and academic activities scheduled during the same period is mandatory (agreement Council University, art. Third, subparagraph IV, 1927 session).**
- This course by nature is theoretical-practical, which includes the scheduling of a special examination.
- All the jobs that are scheduled as part of the evaluation of the course must be original, produced by the students of the course with up-to-date and relevant information.
Plagiarism of work shall be punishable as set forth in article 24 of the General Regulation of teaching and learning that indicates the following:

"Is considered plagiarism the partial or total reproduction of documents non-presenting them as their own. In the case which proves the plagiarism by students, you will lose the course. If he does it will be suspended by a school career, and if the situation repeats itself once again, he will be banned from the University"."

- This article shall apply in the various activities scheduled in the course, such as tasks, group work, tour report and research work, if these do not have the respective citations (according to the IICA rules) and are presented as homemade.
- The delay in the delivery of reports and documents shall be penalized with 10%, and 10% for each day up to a maximum of 72 hours. After this period reports or documents are not accepted. As with critical analyses of reading the delivery of documents must be at the beginning of the lesson.
- Remember that **the use of cell phone in class is not allowed.**
- Article 16. Assessment procedures included in the program of the course only may be varied by justified reasons and by agreement of the teacher and students, established at least one week prior to the implementation of the change in the evaluation.
- Article 20. Professor shall designate, in writing, in the corresponding evaluation document, the relevant observations and must deliver and discuss with students the results of the evaluation, within one period not to exceed eight calendar days from the date on which took place.
- Article 21. Evaluations shall be carried out in the hours corresponding to the course or other previously established in the program dates. If you require a change in the schedule and dates, there should be agreement between professors and students for the new assigned date.

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English: http://www.cifor.org/publications/pdf_files/OccPapers/OP-42.pdf