SYLLABUS

UTAH STATE UNIVERSITY

COLLEGE OF SCIENCE-BIOLOGY DEPARTMENT

Full Course Title:

BIOL 4750 Special Topics in Biology- Tropical Ecology and Sustainability
BIOL 6750 Special Topics in Biology- Tropical Ecology and Sustainability

Title on transcript:

BIOL 4750 Trop Ecology / BIOL 6750 Trop Ecology

Credits: 3

INSTRUCTOR:

Dr. Samuel Rivera, Biology Dept. E-mail: samuel.rivera@usu.edu (mailto:samuel.rivera@usu.edu)

Jessica Murray, PhD cand. Biology Dept. E-mail: murray.jessica@aggiemail.usu.edu (mailto:murray.jessica@aggiemail.usu.edu)

COURSE OBJECTIVES:

The ultimate goal of the course is to provide a nontraditional approach for "internationalizing" students who are interested in tropical ecology, natural resource issues, environments, cultural underpinnings, and careers.

In a general sense, the course experience aims to accomplish the following objectives:

- Expand students’ knowledge and appreciation of tropical ecosystems, including their biodiversity, their ecosystem services, the importance of tropical forests in the global carbon cycle, and conservation issues.
- Develop students’ science literacy through familiarity with research and the scientific method
- Improve student’s knowledge of the impact of globalization on tropical ecosystems including natural resource management and development.
- Enhance the prospects for students to identify opportunities for further study, professional development, or career advancement in biology, ecology, or natural resource sustainability.
- Enrich the multicultural and diversity awareness and ideological foundation of students at becoming more effective communicators and more knowledgeable about the global community.

We will take a broad view of key tropical ecology and sustainability issues, especially the tropical rain forests that have global scope, implication, and effect. As well, we will examine specific case studies and examples by focusing our study and travel on the tropics of Latin America, particularly on Costa Rica. This will enable us to more closely examine and better understand the linkages between the North and the South, and people and natural resources. Through direct contact and experience, students will be able to effectively express their awareness and understanding of tropical ecology and natural resource management resources in the tropics, and they will be able to extrapolate what they have learned to the global community in general. The students will also learn social, cultural, political and economic importance of tropical ecosystems and their associated natural resources. From the study trip, the student will learn from the local managers how limited, rustic, but effective -to some extent- tools might become effective for administration and management of forests and natural resources, especially those regarding sustainable forestry, soil and water conservation, agroforestry and agricultural systems. Finally, students will have an opportunity for cultural enrichment that integrates a blend of experiences in language, ethnology, history, society, and environment. For sure, at the end of this course, there will be more questions than answers.
COURSE DESCRIPTION:

This course is designed for upper level biology undergraduate students, graduates, and others from other majors seeking a learning opportunity to examine tropical ecology and environmental issues in natural resource management in the tropics in a global context.

This course will introduce land use, policy, and historical development at the international level in natural resources. Natural, cultural, political, social, and economic elements are integrated in a nontraditional format to promote exploration and expansion of knowledge and awareness of the human relationship with the natural environment on a global scale. For this reason, as mentioned before, the course is open to non-natural resources majors. The course includes a ten-day study travel to the heart of the tropical rain forest of Costa Rica. This is our fourth time travelling to the tropics with this course. The purpose of this study trip will be to study the linkages between natural resources and cultural resources in an international setting while examining and comparing with the experience in the United States. It will also provide the basics to understand the diversity of tropical rain forests and associated natural resources, and the different ways that they are viewed, utilized, and managed by the locals, state and federal agencies and private initiative. This course will stimulate global perspective learning among young professionals.

COURSE FORMAT AND CONTENT:

The course will be divided into three components.

The First Component spans the first five weeks of the semester. During this time, we will develop an overview of world biomes, biodiversity, the tropical rain forest, food web interactions, tropical ecology, ecosystem function and processes, land use changes, policy, climate change implications in the tropics, and current/future research. The course will consist of a combination of lectures (5), reading assignments, and recorded presentations by the instructors. The instructors will follow up on the lecture/assignments via Canvas.

Additionally, students will write a research proposal for a research project they will pursue while at La Selva Biological Station. The students will choose a research topic to pursue and conduct a thorough literature review of prior research on this topic using scientific publications. For undergraduate students, the research proposal should be 2-3 pages long and include a minimum of 6 references. The research proposal will include intro, methods, and significance of the research.

The Second Component of the course involves ten days of travel to Costa Rica, during the 2020-Spring break. This experiential component will include interactions with local natural resource agency professionals, non-government organizations, academics, farmers, industries, laborers and others in a variety of natural settings, forestry and agro forestry operations, the marketplace, and urban and rural communities.

The places to visit are described in the trip itinerary (see below). Every visit has a learning objective. Simultaneous translation -Spanish to English- will be provided by the instructors during these field visits. It is expected that students ask questions and promote discussions to improve everybody's knowledge and we will encourage that those discussions-findings will be incorporated into their final projects.

During the trip, students will maintain a journal that allows them to reflect on their experience, synthesizing the knowledge gained before the trip with the experience gained during the trip. The journal will later serve as a great resource for their final project.

For the Third Component of the course, students will create a final project in which they delve deeper into a topic that they found interesting, combining knowledge gained from the lectures, readings, and experience during the trip. The project may be in the form of a research paper, a newspaper article, a conference poster, oral presentation, or video. More details to come.

LEARNING OBJECTIVES:

The learning objectives are included for each module in the Course Curriculum presented below.

Course Curriculum

The course is composed of 5 units spanning the semester. Five lectures will be delivered during the First Component (first five weeks) of the semester:

<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Objective</th>
<th>Content</th>
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</thead>
</table>
| 1   | Introduction Lecture/Pre-Departure Orientation | Introduce instructors and participants | 1. Review course objectives  
2. Review travel itinerary  
3. Questions/answers |
|     | S. Rivera | Jan-13-2020 |         |
Global distribution of Tropical forests

Tropical rain forest

J. Murray

On-line lecture 1

- What is a tropical rain forest?
- Location
- View and understand the importance of tropical rain forest.

Basic concepts.

1. Main Biome types: importance of forest, carbon dynamics, timber and fiber, People and forest
2. Tropical rain forest ecology Forest management basic principles

Tropical rain forest: management and impact on Society

S. Rivera

On-line lecture 2

- View and understand the importance of tropical rain forest - "producing" ecosystem services
- What is the forest and biodiversity importance?

Basic concepts.

1. Tropical rain forest ecology Forest management basic principles
2. Forest functions
3. The causes of deforestation
4. The scale of deforestation
5. Alternatives of solution to reduce deforestation
   - Coffee's Certifications
   - Cocoa - Chocolate
6. Government policies in developing countries

Overview of Costa Rican Ecosystems

J. Murray

On-line lecture 3

1. Costa Rica Ecosystems.- different life zones, the geography of the country
2. Protected areas in Costa Rica – government (SINAC), private (e.g. Bosque Eterno de los Niños)
3. Role of scientists – history of tropical research and the people who did it, development of OTS research stations
4. Role of managers – the role of ecotourism managers in conservation E.g. adventure parks
5. Role of citizens and communities – Monteverde and carbon neutrality initiatives
6. Challenges in conservation

Management Implications and Climate Change

S. Rivera

On-line lecture 4

- Understand the role of government and different actors in tropical rain forest protection and conservation.
- Learn about the different life zones in Costa Rica – how despite its small size, topography and microclimates promote high diversity
- To understand actions/research needed to better predict and mitigate indirect effects of climate change, including evaluations of how changes in forests and forest response/adaptation.

Basic concepts.

1. Climate change’s main concerns
2. Effects on forest cover and composition: coffee and chocolate as agroforestry systems
3. Effects on water availability
4. Mitigation and adaptation
5. Global initiatives such as REDD (Reduction of Emission from Deforestation and Degradation)

Canvas

The course will use Canvas, mainly on its first/third components for course follow up, announcements, assignment delivery and submission, quizzes, discussions, grades, etc. In addition to course follow up, Canvas serves a basic communication of announcements, addressing frequently asked questions (FAQ), and general discussions. Students are expected to monitor Canvas messaging in order to receive communications about the class in a timely manner. The instructor will make efforts to respond to students within 24 hours. The discussion board will be used as a forum for students to post any questions/comments about the modules. Student participation and helpfulness in answering other students’ questions in the discussion forum will be evaluated as part of the grading structure. Help using the Canvas system can be obtained by contacting USU Information Technologies at 797-HELP or going to http://it.usu.edu (http://it.usu.edu).
Internet access
A reliable high-speed internet connection is required for all students enrolled.

Required Textbook
No required text. Periodic readings from online sources will be assigned.

Supplementary Textbook:


Research Proposal Format
The research proposal will be 2-3 pages long (double spaced, 12-point Times New Roman) and include an Intro, Methods, and Significance section. It should have a minimum of 6 peer-reviewed references.

EVALUATION
Course grade breakdown follows:
100 points total
15 points – class participation
20 points- reading assignments (4 pts each)
25 points – research proposal
15 points – trip journal
25 points – final project

COURSE GRADING
- The course grading system and grading scale will be translated to letter grades as follows: 93-100%: A; 92-90%: A-; 89-88%: B+; 87-83%: B; 82-80%: B-; 79-78%: C+; 77-73%: C; 72-70%: C-; 69-68%: D+; 67-63%: D; <63%: F.

COURSE SUBSTITUTION IN BIOLOGY
This course could substitute as a field class in the Biology Emphasis -which includes substitution for BIOL 3220 Field Ecology (QI)-. It also serves as a substitute for the classes in the ‘Plant Biology cluster’ in the Ecology/biodiversity Emphasis and for the classes in the ‘Plant Identification cluster’ of the Environmental Emphasis. It can also work as a Biology Elective credit in any Emphasis in the Biology major.

ACADEMIC FREEDOM AND PROFESSIONAL RESPONSIBILITIES
Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities: http://personnel.usu.edu/policies/403.htm.

ACADEMIC INTEGRITY – “THE HONOR SYSTEM”
Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students.
The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize.

Traveling abroad may represent a good learning opportunity, however unusual and incorrect conduct may pose a risk not only for the student but also for others. Abiding to the country’s law and university’s policies will make the students not only look like “good ambassadors” but also will keep everyone safe.

PLAGIARISM

"Plagiarism includes knowingly representing by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials" (Student Code page 10). If you have any questions about whether work you submit is plagiarized, contact your instructor before you hand it in. In addition, in this course, you may not hand in the same paper for two classes. Please contact your other instructors; some instructors may have a different policy regarding what is sometimes called “self-plagiarism.”

STUDENTS WITH DISABILITIES

The Americans with Disabilities Act states: “Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center, preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille.”

SEXUAL HARASSMENT

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcomed sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Opportunity Office, located in Old Main, room 161, or call the office at 797-1266.

GRIEVANCE PROCESS (STUDENT CODE)

Students who feel they have been unfairly treated [in matters other than (i) discipline or (ii) admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: http://studentlife.tsc.usu.edu/stuserv/pdf/student_code.pdf (Article VII. Grievances, pages 25-30).

INTERNATIONAL TRAVEL PLANNING:

It is estimated that the cost of this study trip will be around $975 plus study abroad tuition. It includes: Food and lodging for 8 days, 2-3 meals per day, entrance fees to national parks and locations, local transportation, a sim card for individual cell phones, university fees and health and accident insurance.

The travel preparation and organization –including university liability- will be handled by the USU Study Abroad Program (under short term-Costa Rica Program). Students need to fill out an on-line application form and pay a $150 non-reimbursable application fee. Other issues will be discussed in the class such as: Passports and vaccinations, general behavior and presence in a foreign country, safety, security, health and sanitation issues, medical insurance and liability, handling currency and appropriate clothing.

The following is the tentative travel itinerary -minor changes can be added or deleted as the traveling dates approach:

**TRAVEL TO COSTA RICA**

**TENTATIVE ITINERARY**

**TRAVELING DATES: Feb 28-Mar 8, 2020**

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Fri</td>
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<td>19:00 Departure from Logan.</td>
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<tr>
<td>Feb</td>
<td>Afternoon departure from Logan, Utah, USA, travel to Costa Rica.</td>
<td>23:40 Overnight flight from SLC via Orlando by Jet Blue</td>
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Visit to Poas Volcano National Park (http://costa-rica-guide.com/parks/poas.htm)
Tel. (506) 442-7041
Entrance fee (~$15)
Objectives:
1. Get a glance to a National Park in another country: visitor center and organization
2. Learn about their flora and fauna
3. How do they contribute to the sustainability of rain forests?
Contact: Juan Dobles
(506) 2482-1286
jbdobles@accvc.org
Remarks: visit the visitors center 30 min hike to the crater. Bird watching.

Transportation provided by:
TRANSUCA SA <transuca@racsa.co.cr>

Atlantic coast: Cahuita National Park
Entrance fee ($25)
Objectives at Cahuita NP:
1. Get a glance to a natural protected area
2. Learn about their flora and fauna
3. How do they contribute to the sustainability of rain forests?
Contact: Dr. Jose Melgar
jmelagar@earth.ac.cr

Sat
Feb
29th
07:00 Arrival into San Jose, Costa Rica (Juan Santamaria airport, http://en.wikipedia.org/wiki/Juan_Santamar%C3%ADa_International_Airport)
07:30 Currency exchange or ATM stop.
08:00 Loading bags, boarding bus-leaving airport (32 km, travel time: 60 min, depending on traffic).
09:00 Breakfast at Fredo Fresas restaurant, info@frodofresas.com (mailto:info@frodofresas.com) Tel. 2482-28-00 (You Tube video: Restaurante Fredo Fresas (http://www.youtube.com/watch?v=d5a8_Gau9rw))
11:00 Poas Volcano National Park’s tour
15:00 Departure from Poas Volcano NP to Earth University (128 km, travel time: 2 h 40 min depending on traffic across San Jose).
18:00 Arrival at Earth University (EU) – hotel check-in
18:30 Dinner at cafeteria – Earth University
20:00 Meeting at Cafeteria or Hotel lobby – check itinerary and rules, meet Dr. Jose Melgar, our host at EU.
Hotel: Sofia Montero: somontero@earth.ac.cr (mailto:somontero@earth.ac.cr)

Sun
Mar
1st
06:30 Breakfast at EU’s cafeteria
07:00 Departure from EU to Cahuita N.P. (117 km, travel time 2h 30m)
08:00 Visitor center at Cahuita N.P., hiking a 4 km trail along the beach trail.
13:00: Lunch at a local restaurant (Caribbean Sea food)
14:30 A relax at the beach
15:00 Short stop at the town of Puerto Limon
16:30 Return to EU (74 km, travel time 1h 40 min.)
18:30 Dinner at EU’s cafeteria or on the road…
20:00 packing for traveling back to La Selva Biological Station (OTS) next day.
Earth University of Costa Rica,
https://www.earth.ac.cr  E.A.R.T.H. University is an agricultural college with a focus on investigating sustainable agriculture in tropical environments.

Objectives:
1. Get a glance of another university in a different country/setting/culture.
2. What is different to USU?
3. What is the purpose of carbon neutral policy?
4. What is the role of the EU regarding this issue in Costa Rica and the region?

Contact:
Sofia Montero  somontero@earth.ac.cr
Dr. Jose Melgar  jmelagar@earth.ac.cr

Mon Mar 2nd
08:00 Breakfast at EU cafeteria
10:00 Talk on educational model at the Earth University
11:00 Talk on Neutral Carbon in Costa Rica and the role of Earth University
12:05 Lunch at the Earth University (EU) cafeteria
13:30 Tour on campus facilities.
14:00 Development of research project
18:30 Dinner at a local restaurant
21:00 Arrival to EU lodging facilities
CATIE Botanical Garden (www.catie.ac.cr (http://www.catie.ac.cr))

CATIE campus visit. Entrance fee ($43)

Objectives at Botanical Garden:
1. Learn about the botanical garden of a CATIE: a regional agricultural research center of Costa Rica
2. Meet at the botanical garden, plants that may have never seen before such as: cinnamon tree, nutmeg, cinnamon, or aloe vera, etc.

Tour cost: $35/person, including lunch.

Visit to Guayabo National Monument

Objectives at Guayabo National Monument:
1. Get a glance to a National Monument in another country: visitor center and organization
2. Learn about their flora and fauna
3. Learn about the historic setting of the country of Costa Rica.

Entrance fee (~$10)

Students: ask questions!!

Contacts:
Adriana Arciniegas <aleal@catie.ac.cr>
Jardin Botanico (CATIE)* jardinbotanico@catie.ac.cr

José A. Coto C.
Encargado Jardín Botánico
CATIE/PRAGA
Tel. (506) 2556-2700
Fax (506) 2556-2703
www.catie.ac.cr/catienatura (https://mail.catie.ac.cr/owa/redir.aspx?C=wNhN05nVhKSLzQzYOD87N9W4BFANEIuJ43udB7Chdv86cr8yA-wVPY0gpm- b18T2L3TCWcBY.&URL=http://www.catie.ac.cr/catienatura)

Evelyn Chavez
(tel 2558-2602, evelyn.chaves@catie.ac.cr (mailto:evelyn.chaves@catie.ac.cr))

07:00 Breakfast at EU cafeteria–cleaning rooms

08:00 Departure to CATIE Botanical garden in Turrialba. Travel distance: 64 kilometers from EU campus. Travel time: 1 h 30 min.

10:00 CATIE campus bus tour

10:30 Visit the CATIE’s Botanical Garden: collections of tropical crops (cocoa and coffee plantations).

12:00 Lunch at CATIE’s cafeteria

13:30 Departure from Catie to Guayabo National Monument (travel time: 40 min)

14:30 Visit and tour to Guayabo National Monument

14:00 Tour and walk

17:00 Stop at grocery store on the way back to Earth University campus (53 kms, travel time: 1h 30 min)

18:00 Dinner at EU’s cafeteria
Morning:
Visit La Selva Biological Station (LSBS, OTS)
https://tropicalstudies.org/

Contact:
Orlando Vargas
Tel. + (506) 8938-6677
e-mail: orlando.vargas@tropicalstudies.org

Wed
4th

07:00 Breakfast at EU’s cafeteria

Morning:
07:30 Departure from EU to La Selva Biological Station (74 kms, travel time: 1h 15 min)

09:00 Walk to room and accommodations.
10:00 Guided tour the station.
10:30 Meeting a classroom for instructions to start the Research project
12:30 Lunch at La Selva Biological station cafeteria (cost: ~$10/meal)
13:30 Continue working on projects.
16:30 Meeting at classroom to discuss advances
17:30 Break
18:00 Dinner at LSBS’s cafeteria
18:00 Meeting at classroom for group presentations

Thu
5th

Second day at La Selva Biological Station (OTS)
https://tropicalstudies.org/

07:00 Breakfast at La Selva BS’s cafeteria
08:00 Meeting at classroom to discuss advances
13:00: Lunch at cafeteria
14:30 Continue working on projects
18:30 Dinner at LSBS’s cafeteria
20:00 packing for traveling back to San Jose next day.

07:00 Breakfast at La Selva BS’s cafeteria

Fri
6th

Third day at La Selva Biological Station (OTS)
https://tropicalstudies.org/

Atlantic coast: River floating on Rio Puerto Viejo

Entrance fee ($50)

Objectives at Rio Puerto Viejo:
1. Get a glance to a natural protected area
2. Learn about their flora and fauna
3. How do they contribute to the sustainability of rain forests?

Contact:
Orlando Vargas
Tel. + (506) 8938-6677
e-mail: orlando.vargas@tropicalstudies.org

07:00 Breakfast at La Selva’s cafeteria
08:00 Leave for float trip from station
09:00 River rafting tour
13:00: Lunch at La Selva
14:00: Drive to San José
16:00 Arrive to Ave del Paraiso hotel
18:00 Dinner in San José

Sat
7th

07:00 Breakfast at La Selva’s cafeteria

08:00 Leave for float trip from station
09:00 River rafting tour
13:00: Lunch at La Selva
14:00: Drive to San José
16:00 Arrive to Ave del Paraiso hotel
18:00 Dinner in San José

Sun
8th

Return to USA

Transportation provided by:
TRANSUCA SA <transuca@racsa.co.cr>

03:30 Departure from Ave del Paraiso Bed and Breakfast
04:00 Airport check in
06:20 Flight departure from San Jose to Orlando, USA
14:00 Arrival into Salt Lake City, UT.

A FEW NOTES:
1. **CELL PHONES:** Students are encouraged to bring an unlocked cell phone. We will purchase Sim cards for everyone, so all group can communicate with others during the traveling.

2. **CURRENCY:** exchange rate for US dollars as of April, 2019 is about $593.00 (colones) per 1 US$,

3. Debit cards can be used at ATMs and many offers either US$ or local currency and they give a favorable exchange rate, so bring you PIN. VISA and MASTER CARD Credit/debit cards are widely accepted in retail establishments, restaurants, hotels and gas stations etc., with VISA being the most widely accepted and AMEX and Discovery being the least accepted. US Cash is widely accepted. US $s are widely accepted but try to bring only bills in decent condition and not excessively torn or heavily marked as some places may not accept them if in bad condition.

4. **WEATHER IN COSTA RICA**

5. Costa Rica has only two seasons: The dry season from late November to mid-April and the rainy season from May to mid-November (hurricane season). In the capital city: San José, located at an elevation of 3,280 ft (1,000 mts) the average year around temperature is 71 degrees Fahrenheit (22 Celsius) with the lowest temperatures recorded in December and January (64 F, 18 C) and the highest in March and April (80 F, 27 C). Rainfall also varies considerably: During June, and July, it usually rains 1-2 hours during the day and then the sky clears up. An annual rainfall amount averaging 77 inches (1,960 mm) with September and October recording the highest amounts and January and February the lowest. Some National Parks reports annual precipitation between 4,000-8,000 mm (150-300 inches/year). Some places receive as much as 12 feet of annual precipitation. In March, we will be in the dry season (outside the hurricane season) however a few showers are expected, but mostly clear and sunny skies. Temperatures between 70-80 F. Sunrise: 5:17am, Sunset: 5:59pm.

Main image: Aerial view of rainforest canopy in Guatemala, Central America. Credit: soft_light/Shutterstock.com