

**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.

### **DESIRABLE COURSE REQUIREMENTS:**

1. Write a short essay about the purpose of taking this course and participate in an in-person interview with the instructors.
2. Willing to learn about regional biogeography and ecosystem structure, function, and process in the tropical rain forest and its cultural setting.
3. Some Spanish skills are desirable, but not mandatory.

### **JUSTIFICATION STATEMENT:**

*What is a rainforest?* Rainforests are home to two-thirds of all the living animal and plant species on the planet. They are found in Africa, Central and South America, and Southeast Asia. Tropical rainforests produce 40% of Earth's oxygen and store up to 300 Pg C (1/3 of what is held in the atmosphere!). Tropical forests exchange more carbon with the atmosphere than any other biome, making them one of the most important players in the global carbon cycle.

These forests represent 6% of the world area having a nearly five million species. In South America, the Amazon River basin rainforest contains a wider variety of plant and animal life than any other biome in the world. There may be 40 to 100 different tree species in 1 hectare (2.5 acres) of a tropical rain forest. Scientists have counted about 100 to 300 species per hectare. Seventy percent of the plants in the rainforest are trees. About 1/4 of all the medicines we use come from rainforest plants, and more than 1,400 varieties of tropical plants are thought to be potential cures for cancer. There may be 40 to 100 different species of animal life per hectare of a tropical rain forest. Insects make up the largest single group of invertebrate animals that live in tropical forests. They include brightly colored butterflies, mosquitoes, camouflaged stick insects, and huge

colonies of ants. Utah is 24 times as big as Costa Rica, and it alone hosts 65 amphibian species.

*What is happening with the rainforest?* Around 62% of the primary forest of tropical ecosystems has been already lost. It is estimated that for the decade of the 90's the global deforestation rate in the tropics reached 15.4 million hectare/year. In countries, like Honduras alone a hectare of forest is cleared for agriculture every five minutes. The environmental equilibrium disruption is reflected by problems in the areas of agriculture, water management, marine resources, wildlife, and human health. As a result, this phenomenon has serious environmental consequences such as, loss of soil fertility, soil erosion, river channel sedimentation, reduction on hydroelectric generated power, reduction of habitat for wildlife, decreasing in drinking water quality, and increasing floods. This vicious circle of poverty-environment deterioration is one of the most driving causes of human immigration to most develop regions.

*How climate change is affecting tropical forests and biodiversity in the tropics?*

As opposed to temperate ecosystems, the range of ambient temperatures in the tropics is very narrow, so species are sensitive to abrupt changes. Rising temperatures, including 1 degree C in the last century, will have a profound impact on rainforests and are already taking a toll on some tropical species. Every thousand meters in elevations, temperature drops 6 degrees C, so species are evolving and migrating up the hills to compensate for warmer climate. However, mountain top species are suffering having nowhere to migrate, rendering them vulnerable to extinction. Scientific evidence indicates that warmer heat waves are already causing grater mortality of certain tropical species, affecting many plant and animal species a biodiversity on this biologically richest region of the planet. Warmer temperatures and increased drought due to climate change, in combination with deforestation, may cause tropical forests to become a carbon “source”, generating large climate change feedbacks.

*Why Latin America is so important for the US?* The Latin America corridor serves as a natural pathway of plant and animal species between North and South America. It hosts nearly 65% of the temperate migratory birds during the cold winter months. Central America possesses the largest coral reef ecosystems in the hemisphere. It also provides a great opportunity to study a wide diversity of ecosystems. These include tropical rain forests, arid or deciduous tropical forests, cloud forests, mangrove wetland, and pine forests. Tropical forests are typically associated with coastal mountains receiving high amounts of precipitation hosting an enormous amount of living animal and plant species.

*The United States is starting to pay more attention to its Southern neighbors.* After several years of debate, the US Congress passed (2008) an Agreement called DR-CAFTA: Dominican Republic and Central America Free Trade Agreement. The agreement was signed by the governments of Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Costa Rica and the United States of America. The agreement is intended to facilitate free trade of goods among the countries, but also recognizes the geo-political importance, long and productive history of cooperation among these seven countries with existing and commons geopolitical and environmental issues. The signing countries are convinced of the importance of promoting all possible forms of cooperation to improve their economies, and also protect,

improve and conserve the environment, including natural resources, in the context of achieving their sustainable development objectives.

As a result, the US Congress has approved several grants to provide US Government agencies mechanisms of building capacity to protect the environment in concert with the strengthening of trade and investment relations in these countries. The funds will serve to promote economic development, social development and environmental protection directed to augment institutional. The intention is to increase professional and scientific capacity to achieve the objective of sustainable development for the well-being of present and future generations. Currently, USAID, US Geological Survey, USDA-US Forest Service- International Forestry, and other US agencies have an active presence in Latin America, and more human resources are going to be needed to address these issues.

*The importance of science literacy and familiarity with the scientific method.* Knowledge generated through research informs every aspect of our lives, from medicine to technology to the food we eat. Additionally, science can inform sound policy related to public health, the environment, and other critical aspects of society. Unfortunately, an obstacle to the development of science-informed policy is a lack of confidence (or understanding) in scientific research among many public officials and citizens in the United States. Giving students the opportunity to engage in research and the scientific method is an effective way of promoting scientific literacy and critical thinking, skills that are applicable any career. The tropics are rich with biodiversity and a history of foundational ecological research, providing an ideal context to develop simple but interesting research projects.

#### **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. Our 1-hour weekly class sessions will consist of a combination of lectures (5), discussions of readings, and presentations by the instructor. The instructors will follow up on the lecture/assignments via *Canvas*.

Additionally, students will conduct a literature review in the form of a term paper and develop a short research project to pursue while in Costa Rica. 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 literature review should be 3-4 pages long (minimum 6 references), and for graduate students, the paper should be 6-10 pages long (minimum 10 references).

The literature review will then be used to develop a research proposal for a project to be carried out during the trip to Costa Rica. The research proposal will include intro, methods, and significance of the research (1-3 pages long). Projects will be conducted either through field research or interviews and must be within the scope of the trip. After returning to USU, students will create conference-style posters summarizing the findings of their projects and present them at the end of the semester.

Some project examples include:

Ecological Research:

- Epiphytic plant host-tree specificity
- Leaf cutter ants: distance traveled from nest to host tree, how size varies with caste?
- Do more birds visit fruiting trees in open areas or forested areas?
- Do certain color flowers receive more pollinators?
- How does insect diversity change with distance from buildings?
- How does bird diversity differ between forested patches and agricultural patches?

Social Research:

- How do some non-scientists in Costa Rica perceive research stations in their communities?
- How does biodiversity and conservation promote alternative livelihoods in Costa Rica?
- How is market-based conservation used in Costa Rica?
- What is the perception of ecosystem services provided by tropical regions among Costa Ricans?
- How well are environmental laws implemented and enforced in Costa Rica?
- How do different agriculture practices affect public and environmental health in Costa Rica?

All research topics must be approved –via canvas/email- by the instructor/TA.

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 in their research projects.

The *Third Component* of the course, spanning the last four weeks of the semester, focuses primarily on independent work on their research projects and experience-sharing among class participants. The students will also prepare and present to the campus community through an "open house" to report their experience in the study trip. The instructors will follow up the course via Canvas and coordinate the final meeting for presentations.

### **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 1-hour lectures will be delivered once a week during the *First Component (first five weeks)* of the semester:

No.	Topic	Objective	Content
1	Introduction Lecture/Pre-Departure Orientation S. Rivera Jan-13-2020	<ul style="list-style-type: none"> <li>Introduce instructors and participants</li> </ul>	<ol style="list-style-type: none"> <li>Review course objectives</li> <li>Review travel itinerary</li> <li>Questions/answers</li> </ol>
2	Global distribution of Tropical forests J. Murray <i>On-line lecture 1</i>	<ul style="list-style-type: none"> <li>What is a tropical rain forest?</li> <li>Location</li> <li>View and understand the importance of tropical rain forest.</li> </ul>	<p>Basic concepts.</p> <ol style="list-style-type: none"> <li>Main Biome types: importance of forest, carbon dynamics, timber and fiber, People and forest</li> <li>Tropical rain forest ecology Forest management basic principles</li> </ol>
3	Tropical rain forest: management and impacts on society S. Rivera <i>On-line lecture 2</i>	<ul style="list-style-type: none"> <li>What is the forest and biodiversity importance?</li> <li>View and understand the importance of tropical rain forest “producing” ecosystem services</li> </ul>	<p>Basic concepts.</p> <ol style="list-style-type: none"> <li>Tropical rain forest ecology and management basic principles</li> <li>Forest functions</li> <li>The causes of deforestation</li> <li>The scale of deforestation</li> <li>Alternatives of solution to reduce deforestation <ol style="list-style-type: none"> <li>Coffee’s Certifications</li> <li>Cocoa - Chocolate</li> </ol> </li> <li>Government policies in developing countries</li> </ol>
4	Overview of Costa Rican Ecosystems J. Murray <i>On-line lecture 3</i>	<ul style="list-style-type: none"> <li>Understand the role of government and different actors in tropical rain forest protection and conservation.</li> <li>Learn about the different life zones in Costa Rica – how despite its small size, topography and microclimates promote high diversity</li> </ul>	<ol style="list-style-type: none"> <li>Costa Rica Ecosystems.- different life zones, the geography of the country</li> <li>Protected areas in Costa Rica – government (SINAC), private (e.g. Bosque Eterno de los Niños)</li> <li>Role of scientists – history of tropical research and the people who did it, development of OTS research stations</li> <li>Role of managers –the role of ecotourism managers in conservation E.g. adventure parks</li> <li>Role of citizens and communities – Monteverde and carbon neutrality initiatives</li> <li>Challenges in conservation</li> </ol>
5	Management Implications and Climate Change S. Rivera <i>On-line lecture 4</i>	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ol style="list-style-type: none"> <li>Climate change’s main concerns</li> <li>Effects on forest cover and composition: coffee and chocolate as agroforestry systems</li> <li>Effects on water availability</li> <li>Mitigation and adaptation</li> <li>Global initiatives such as REDD (Reduction of Emission from Deforestation and Degradation)</li> </ol>
6	Research in the tropics J. Murray <i>On-line lecture 5</i>	<ul style="list-style-type: none"> <li>Discussion about the scientific method and conducting research – my research as a case study</li> </ul>	<ol style="list-style-type: none"> <li>The Canopy Soil Stock Research</li> <li>Design of Experiments</li> <li>Climate change research needs</li> <li>Carbon sequestration research needs</li> </ol>

## **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>.

## **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:**

- Douglas P. Reagan and Robert B. Waide, 1996 *The Food Web of a Tropical Rain Forest*. The University of Chicago Press. 623p. ISBN: 9780226706009
- Maarten Kappelle, Thomas E. Lovejoy. 2016. *Costa Rican Ecosystems*. The University of Chicago Press. 760 pages. ISBN-13: 978-0226278933
- Adrian Forsyth, Ken Miyata, Dr. Thomas Lovejoy, 1987 *Tropical Nature: Life and Death in the Rain Forests of Central and South America*. Charles Scribner's Sons; Reprint edition (January 29, 1987). 248 p. ISBN-13: 978-0684187105

## **Literature Review Format**

*Topic:* If you have an interest in a particular topic, e-mail a description to the instructor/TA, otherwise choose a topic of page 4's list.

*Format:* For undergraduate students, the paper will be 3-4 pages long, for graduate students the paper will be 6-10 pages long, and a deeper analysis and reasoning are expected. The term paper is double-spaced, 12-point Times New Roman type, and standard MS Word margins. This is a research paper. All factual statements must be based on published research or a reliable source.

*Number of citations:* Use a minimum of six sources of information (10 sources for graduate students) appropriately cited. At least half of the citations must be articles from refereed scientific journals. In the case of web-based sources cite the *url* and date accessed.

## **Research Proposal Format**

The research proposal will be 2-4 pages long (double spaced, 12-point Times New Roman) and include an Intro, Methods, and Significance section.

## **Conference-Style Poster Format**

The conference-style poster will be created in PowerPoint or other software and include the following sections: Intro, Methods, Results, Discussion. It should include visual aids including graphs, photos, or diagrams.

### **EVALUATION**

This course will be evaluated in the following manner, out of 100 points: Class participation: 15%, Open house presentation and final project: 25%, reading assignments: 20% (4% each), research proposal: 25%, trip journal: 15%, total: 100%.

### **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.

### **HOURS REVIEW TO MEET A 3-CREDIT COURSE**

This course hours have been reviewed to meet the USU requirement of a 3-credit course. Especial emphasis has been given to each activity to make a total of 122 hours, being 120 hours needed for a 3-credit class. See table below:

<b>Item</b>	<b>units</b>	<b>hours per unit</b>	<b>total hours</b>
Pre-trip lectures	5	1	5
Travel preparation lecture	1	1	1
Quizzes	14	0.5	7
Literature review pages	3	2	6
Literature review references	6	1	6
Research proposal	2	2	4
Supplementary text, Tropical Ecology	14	1	14
Supplementary text, Costa Rican Ecosystems	11	1	11
Day 1- 28-Feb	Travel day		
Day 2: Feb-29	6	1	6
Day 3: 1-Mar	8	1	8
Day 4: 2-Mar	8	1	8
Day 5: 3-Mar	8	1	8
Day 6: 4-Mar	8	1	8
Day 7: 5-Mar	8	1	8
Day 8: 6-Mar	8	1	8



Day 9: 7-Mar	8	1	8
Day 10: 8-Mar	Return home	1	
Conference-style poster	4	1	4
Open house presentation	2	1	2
Total: 122 (120 hours needed for a 3-credit class)			122

## **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](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 \$835 plus tuition. It includes: Food and lodging for 8 days, 2 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**

<b>Date</b>	<b>Place</b>	<b>Activity</b>
Fri Feb 28	Afternoon departure from Logan, Utah, USA, travel to Costa Rica.	19:00 Departure from Logan.  23:40 Overnight flight from SLC via Orlando by Jet Blue
Sat Feb 29 <sup>th</sup>	Visit to <i>Poas Volcano</i> National Park ( <a href="http://costa-rica-guide.com/parks/poas.htm">http://costa-rica-guide.com/parks/poas.htm</a> ) 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 <a href="mailto:jbdobles@accvc.org">jbdobles@accvc.org</a>  Remarks: visit the visitors center 30 min hike to the crater. Bird watching.  Transportation provided by: <b>TRANSUCA SA</b> < <a href="mailto:transuca@racsa.co.cr">transuca@racsa.co.cr</a> >	07:00 Arrival into <i>San Jose</i> , Costa Rica ( <i>Juan Santamaria</i> airport, <a href="http://en.wikipedia.org/wiki/Juan_Santamar%C3%ADa_International_Airport">http://en.wikipedia.org/wiki/Juan_Santamar%C3%ADa_International_Airport</a> ) Flight from Orlando by Jet Blue 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 <i>Fredo Fresas</i> restaurant, <a href="mailto:info@frodofresas.com">info@frodofresas.com</a> Tel. 2482-28-00 (You Tube video: <a href="http://www.youtube.com/watch?v=d5a8_Gau9rw">http://www.youtube.com/watch?v=d5a8_Gau9rw</a> ) 11:00 <i>Poas Volcano</i> National Park's tour 15:00 Departure from <i>Poas</i> 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: <a href="mailto:somontero@earth.ac.cr">somontero@earth.ac.cr</a>
Sun Mar 1 <sup>st</sup>	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: <a href="mailto:orlando.vargas@tropicalstudies.org">orlando.vargas@tropicalstudies.org</a>	07:30 Breakfast at EU's cafeteria 08:00 Departure from EU to Puerto Viejo (52 km, travel time 1 h) 09:00 River rafting tour (optional) 13:00: Lunch at a local restaurant (Caribbean Sea food) 14:30 ...relax at the river's pools 15:00 Short stop at the town of Siquirres 16:30 Return to EU (20 km, travel time 23 min.) 18:30 Dinner at EU's cafeteria
Mon Mar 2 <sup>nd</sup>	Earth University of Costa Rica, <a href="https://www.earth.ac.cr">https://www.earth.ac.cr</a> E.A.R.T.H. University is an agricultural college with a focus on investigating sustainable agriculture in tropical environments.	08:00 Breakfast at <i>EU cafeteria</i> 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

	<p>Objectives:</p> <ol style="list-style-type: none"> <li>1. Get a glance of another university in a different country/setting/culture.</li> <li>2. What is different to USU?</li> <li>3. What is the purpose of carbon neutral policy?</li> <li>4. What is the role of the EU regarding this issue in Costa Rica and the region?</li> </ol> <p>Contact: Sofia Montero <a href="mailto:somontero@earth.ac.cr">somontero@earth.ac.cr</a> Dr. Jose Melgar <a href="mailto:jmelagar@earth.ac.cr">jmelagar@earth.ac.cr</a></p>	<p>12:05 Lunch at the Earth <i>University</i> (EU) cafeteria 13:30 Tour on campus facilities. 14:00 Development of research project 18:30 <i>Dinner at a local restaurant</i> 21:00 Arrival to <i>EU lodging facilities</i></p>
Tue Mar 3th	<p>CATIE Botanical Garden (<a href="http://www.catie.ac.cr">www.catie.ac.cr</a>) CATIE campus visit. Entrance fee (\$43) (<a href="http://www.catie.ac.cr/magazin_ENG.asp?CodigoIdioma=ENG">http://www.catie.ac.cr/magazin_ENG.asp?CodigoIdioma=ENG</a>)</p> <p>Objectives at Botanical Garden:</p> <ol style="list-style-type: none"> <li>1. Learn about the botanical garden of a CATIE: a regional agricultural research center of Costa Rica</li> <li>2. Meet at the botanical garden, plants that may have never seen before such as: cinnamon tree, nutmeg, cinnamon, or aloe vera, etc.</li> </ol> <p>Tour cost: \$35/person, including lunch.</p> <p>Visit to <i>Guayabo</i> National Monument (<a href="http://costaricabureau.com/nationalparks/guayabo.htm">http://costaricabureau.com/nationalparks/guayabo.htm</a>)</p> <p>Objectives at <i>Guayabo</i> National Monument:</p> <ol style="list-style-type: none"> <li>1. Get a glance to a National Monument in another country: visitor center and organization</li> <li>2. Learn about their flora and fauna</li> <li>3. Learn about the historic setting of the country of Costa Rica.</li> </ol> <p>Entrance fee (~\$10)</p> <p>Students: ask questions!!</p> <p>Contacts: Adriana Arciniegas &lt;<a href="mailto:aleal@catie.ac.cr">aleal@catie.ac.cr</a>&gt;, Jardin Botanico (CATIE)" <a href="mailto:jardinbotanico@catie.ac.cr">jardinbotanico@catie.ac.cr</a> José A. Coto C. Encargado Jardín Botánico CATIE/PRAGA Tel. (506) 2556-2700 Fax (506) 2556-2703 <a href="http://www.catie.ac.cr/catienatura">www.catie.ac.cr/catienatura</a></p> <p>Evelyn Chavez (tel 2558-2602, <a href="mailto:evelyn.chaves@catie.ac.cr">evelyn.chaves@catie.ac.cr</a>)</p>	<p>07:00 Breakfast at <i>EU cafeteria</i>—cleaning rooms 08:00 Departure to <i>CATIE Botanical garden in Turrialba</i>. Travel distance: 64 kilometers from <i>EU campus</i>. <i>Travel time: 1 h 30 min.</i> 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 <i>Catie to Guayabo National Monument</i> (travel time: 40 min) 14:30 Visit and tour to <i>Guayabo National Monument</i> 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</p>
Wed Mar	<p>Atlantic coast: Cahuita National Park Entrance fee (\$25)</p>	<p>06:30 Breakfast at EU's cafeteria</p>

4th	<p>Objectives at Cahuita NP:</p> <ol style="list-style-type: none"> <li>1. Get a glance to a natural protected area</li> <li>2. Learn about their flora and fauna</li> <li>3. How do they contribute to the sustainability of rain forests?</li> </ol> <p>Contact: Dr. Jose Melgar <a href="mailto:jmelagar@earth.ac.cr">jmelagar@earth.ac.cr</a></p>	<p>07:00 Departure from EU to Cahuita N.P. (117 km, travel time 2h 30m)</p> <p>08:00 Visitor center at <i>Cahuita N.P.</i>, hiking a 4 km trail along the beach trail.</p> <p>13:00: Lunch at a local restaurant (Caribbean Sea food)</p> <p>14:30 A relax at the beach</p> <p>15:00 Short stop at the town of Puerto Limon</p> <p>16:30 Return to EU (74 km, travel time 1h 40 min.)</p> <p>18:30 Dinner at EU's cafeteria or on the road...</p> <p>20:00 packing for traveling back to <i>La Selva</i> Biological Station (OTS) next day.</p>
Thu Mar 5th	<p>Morning: Visit <i>La Selva</i> Biological Station (LSBS, OTS) <a href="https://tropicalstudies.org/">https://tropicalstudies.org/</a></p> <p>Contact: Orlando Vargas Tel. + (506) 8938-6677 e-mail: <a href="mailto:orlando.vargas@tropicalstudies.org">orlando.vargas@tropicalstudies.org</a></p>	<p>07:00 Breakfast at EU's cafeteria</p> <p>Morning: 07:30 Departure from EU to <i>La Selva</i> Biological Station (74 kms, travel time: 1h 15 min)</p> <p>09:00 Walk to room and accommodations.</p> <p>10: 00 Guided tour the station.</p> <p>10:30 Meeting a classroom for instructions to start the Research project</p> <p>12:30 Lunch at <i>La Selva</i> Biological station cafeteria (cost: ~\$10/meal)</p> <p>13:30 Continue working on projects.</p> <p>16:30 Meeting at classroom to discuss advances</p> <p>17:30 Break</p> <p>18:00 Dinner at LSBS's cafeteria</p> <p>18:00 Meeting at classroom for group presentations</p>
Fri Mar 6th	<p>Second day at <i>La Selva</i> Biological Station (OTS) <a href="https://tropicalstudies.org/">https://tropicalstudies.org/</a></p>	<p>07:00 Breakfast at La Selva BS's cafeteria</p> <p>08:00 Meeting at classroom to discuss advances</p> <p>13:00: Lunch at cafeteria</p> <p>14:30 Continue working on projects</p> <p>18:30 Dinner at LSBS's cafeteria</p> <p>20:00 packing for traveling back to San Jose next day.</p>
Sat Mar 7th	<p>BRITT Coffee farm and Roaster, (coffee plantation and processing plant) located in Barva de Heredia. <a href="http://www.coffeetour.com">http://www.coffeetour.com</a> Entrance fee: \$22/person, \$35 with lunch</p> <p>Objectives:</p> <ol style="list-style-type: none"> <li>1. Learn about agroforestry</li> <li>2. How does coffee contribute to the sustainability of rain forests?</li> </ol>	<p>07:00 Breakfast at La Selva BS's cafeteria</p> <p>07:30 Departure from LSBS to San Jose, Costa Rica (100 km, travel time: 1h 50 min depending on traffic)</p> <p>10:30. Visit BRITT Coffee Farm and Roaster. Duration: 1 h 30 min. <a href="http://www.coffeetour.com">http://www.coffeetour.com</a></p> <p>12:30 Lunch at BRITT Coffee</p> <p>13:30 Departure from Britt Coffee to San Jose, Costa Rica.</p>

	Remarks: Britt's Coffee Tour has educated and entertained more than a million visitors since 1991. It is a half-day tour through the working gourmet coffee plantation and roastery and fulfill your Costa Rican coffee experience.	<p>14:30 Check in at <i>Ave del Paraiso</i> Bed and Breakfast (B&amp;B) in <i>San Jose</i> (<a href="http://hotelavedelparaiso.com/eng/">http://hotelavedelparaiso.com/eng/</a>)</p> <p>15:00 Free time: time to explore University of Costa Rica campus it is a 10-min walking distance.</p> <p>17:00 Visit to <i>Downtown San Jose</i> and local market.</p> <p>18:00 Dinner at <i>Nuestra Tierra</i> Restaurant Plaza Democracia, downtown San Jose—optional.</p>
Sun Mar 8 <sup>th</sup>	Return to USA Transportation provided by: <b>TRANSUCA SA</b> < <a href="mailto:transuca@racsa.co.cr">transuca@racsa.co.cr</a> >	<p>03:30 Departure from <i>Ave del Paraiso</i> Bed and Breakfast</p> <p>04:00 Airport check in</p> <p>06:20 Flight departure from San Jose to Orlando, USA</p> <p>14:00 Arrival into Salt Lake City, UT.</p>

#### A FEW NOTES:

1. **CELL PHONES:** Students are required 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  $\text{¢}593.00$  (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** (<http://www.infocostarica.com/weather/>)
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.