

Tropical Ecology and Conservation

CREA and the Cocobolo Biological Field Station, Panama

May 20th – June 3rd 2017

Instructors: Dr. Michael Roy, CREA
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Course Description:

Panama is a land of beauty, diversity, and contrast. While Panama is home to the Panama Canal, an engineering marvel and crucial component for world commerce and trade, the country is also internationally recognized as a biodiversity hotspot and is struggling to balance economic growth and protect its natural resources.

Panama hosts an array of landscapes including remote and spectacular rain forests, river gorges, waterfalls, volcanoes, fertile agricultural areas, coral reefs, pristine remote island archipelago's and tree covered highlands. In addition to being rich in natural resources, Panama is also rich in culture and traditions. The Kuna, for example, are a proud and self-governing indigenous people who strive to maintain their traditions, while embracing aspects of modernized society.

This course will examine the ecology of tropical forests their biodiversity, and conservation. In addition to the ecological connections in tropical forests, students will also explore landscape, economic, cultural, and environmental linkages and connections. Students will be provided with hands-on opportunities for exploration and research in the Cocobolo Conservation Area and Panama City.

Course Objectives:

It is anticipated that by the end of the program students will:

- Understand the complex ecological processes within a tropical forest;
- Understand current thinking on the evolution and biogeography of tropical biodiversity through geological history;
- Understand the cultural context of Panama;
- Understand the association between local decisions and actions and potential international impacts of these decisions;
- Learn about local agricultural practices and challenges in Panama;
- Conduct independent research and collect data in the Cocobolo tropical conservation area;
- Better understand and appreciate the impacts of human actions on natural systems and human responses to those changes as related to Panama, and to tropical systems in general;
- Be able to identify relationships between human societies and their natural environments from multiple disciplinary perspectives;
- Experience new cultures and lifestyles that are outside of a student's traditional comfort zone.

Experiences include:

- Visit to Biomuseo – Panama’s Biodiversity Museum
- Visit to Panama Canal
- Visit to an indigenous Embera Village in Chagres National Park
- 10 day stay at Cocobolo Nature Reserve
- Visit to village/farms bordering CNR to meet with local landowners

Course Topics):

- Climate and Natural History of the Neotropics
- Mechanisms of biodiversity
- History of conservation biology
- Conservation in the modern era
- Techniques in conservation planning
- Plant and animal identification
- Field sampling techniques
 - Avian and bat mist netting
 - Small mammal trapping
 - Amphibian sampling
 - Transect surveys
 - Quadrat sampling
 - Aquatic sampling
 - Camera trapping
- Project design
- Data management
- Data analysis

Course reading:

We will use Kricher, J. (2011), *Tropical Ecology*, Princeton Univ. Press as the text book of choice for this course.

Prior to arriving in Panama, all students are expected to have read:

Kricher, J. (1999). *A Neotropical Companion*. Second edition. Princeton Univ. Press. chapters 1-7, 12-14 and appendix.

Other reading:

Balk, Todd. (2003). *The Darkest Jungle: The True Story of the Darien Expedition and America's Ill-Fated Race to Connect the Seas*.

Bourne, Joel (2015). *The End of Plenty: The Race to Feed a Crowded World*. W. W. Norton & Company

Forman, Richard. (1993). *Land Mosaics: The Ecology of Landscapes and Regions*.

Forsythe, Adrian. (1987). *Tropical Nature: Life and Death in the Rain Forests of Central and South America*.

Kennedy, L (2004). *Beyond paradise: Meeting the challenges in tropical biology in the 21st century*

Kolbert, Elizabeth. (2015). *The Sixth Extinction: An Unnatural History*.

Losos E.C. and E.G. Leigh, Jr. (2004) *Tropical forest diversity and dynamism*. University of Chicago Press.

McCullough, David. *The Path between the Seas: The Creation of the Panama Canal, 1870-1914*
Perlin, John. (2005). *A Forest Journey: The Story of Wood and Civilization*.
Royte, Elizabeth. (2002). *The Tapir's Morning Bath: Solving the Mysteries of the Tropical Rain Forest*.

Course Expectations:

1. Students are required to keep a day-by-day journal relating to their experiences in Panama. We will review these journal entries each day (bring a notebook / journal with you)
2. While in Panama, students will engage and conduct research with professional scientists. Students are encouraged to try new areas of interest that are outside of their traditional 'comfort zone' (or on a topic that is associated with an area of personal interest).
3. Each student is expected to lead a 15 minute morning, afternoon, or evening mini-seminar on a topic of his/her choice while in Panama. Topics should be associated with tropical ecology and conservation and can include areas of the student's interest. Handouts for the group are encouraged. All of the preparatory work for this presentation is expected to be completed prior to arriving in Panama.
4. Students are expected to participate in discussions and activities.
5. Each student will be required to select a reflection topic and write a short paper. This paper should not exceed 10 pages. Students are encouraged to integrate their research topics (from #2 and/or #3 above) as well as draw from their journal entries and reading assignments. One approach might be to compare prior expectations of a particular subject (i.e. valuing nature) with field observations while in Panama. The research paper should include citations and sources. The paper is due by August 15th 2017.

Course Evaluation:

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| 1. Participation in discussions, engagement, & research activities: | 40% |
| 2. Journal entries: | 25% |
| 3. Oral presentation while in Panama: | 20% |
| 4. Research Paper | 15% |

Academic Integrity:

All academic work must meet the standards for academic honesty for your university. Each student is responsible for reviewing these standards. See for example: www.honorsystem.vt.edu/

Credits:

CREA is a private non-profit organization and not directly affiliated with any university. Therefore, CREA cannot issue academic credit directly. However, most universities have various mechanisms that allow students to obtain credit for field courses taken away from campus. These are often called "independent study" courses. If you are going to take the course for credit you must arrange this through your professor or academic adviser and university. In most cases this must be done prior to coming to Panama. The CREA course instructor and CREA administrator will provide an official grade transcript to the student's academic institution or adviser. The student will be responsible for providing direct evidence of course participation such as lecture notes, proposals, reports, exams, etc. Normally, up to six units of credit are awarded for each course, three for the lecture portion and three for the field portion. Please contact CREA for details.

Cost and Payment Policy:

The cost of this course is \$1750 and includes:

- All transport for pick and drop off from Panama City airport
- All transport for tours and to Cocobolo Field Station
- All lodging during the trip
- Three meals per day during the trip
- Tuition
- Use of field equipment including tent, mattress for sleeping at the reserve

It does not include (not limited to):

- Airfare to and from Panama
- Individual insurance costs
- Vaccinations and medical supplies (basic first aid is carried by guides and faculty during the trip)
- Snacks and drinks supplemental to the food and beverages supplied during the trip
- Personal equipment, electronics etc.
- Personal clothing, boots, sleeping ware e.g. sleeping bag & pillow

Payment:

- \$500 deposit to be paid 90 days prior to course start
- Full payment to be made before 60 days before trip

Cancellation and Repayment:

- 100% repayment if cancelled before 90 days of course start date
- 50% deposit minus administration fee of \$100 if cancelled between 60 to 89 days before course start date
- Full refund will be made in case CREA cancels the course

Course is limited to 14 students. Those that provide full payment will secure places first.