

Summer Ecosystem Experiences for Undergraduates (SEE-U) 2019

BRAZIL: Tropical Forest Ecosystems

- Learn about tropical forest ecology in the Atlantic Rainforest, a rapidly developing region rich in biodiversity and home to several endangered primates
- Explore the coastal and interior forests of São Paulo State



NEW YORK: Agroecosystems

- Agroecosystems are the dominant ecosystem on Earth today
- Explore these systems locally and regionally at nearby farms
- Classroom sessions on the Columbia University campus, with field trips in and around New York City

JORDAN: Marine and Desert Ecosystems

- Explore the ecology of all of Jordan and observe the flora and fauna of marine, wetland, desert, and forest ecosystems
- Snorkel one of the most pristine coral reefs on Earth
- Learn about international environmental policy



COLORADO: Land Use in the Rocky Mountains

- Explore sustainable development in the American West
- Observe land use concepts in practice in Rocky Mountain ecosystems
- Participate in field activities on federal, state, and private lands

SEE-U in Brief

- Earn 3 credits (Colorado) or 6 science credits (Brazil, Jordan, New York) science credits from Columbia University
- Gain field experience, earn science credits, and explore ecosystems
- Apply early to be eligible for fellowship funding

More information on reverse side. Please visit eices.columbia.edu/see-u/ for detailed information and application instructions. Please email EICES at eices@columbia.edu with questions.

SEE-U General Curriculum

Courses in the SEE-U program consist of lectures, labs, and field-based activities. The program is designed to accommodate both science and non-science majors. No prior field experience is required. All courses are taught in English. Course instruction takes place Monday through Friday or Saturday, with both morning and afternoon sessions.

Program Costs

Nonrefundable application fee: US \$25

Nonrefundable deposit: US \$500 (required upon acceptance to SEE-U*)

Tuition for 2018: US \$4,725 (Colorado) or \$9,450 (Brazil, Jordan, New York)

Room and board for 2018:

US \$1,950 (Brazil and Jordan)

US \$1,300 (Colorado)

US \$850 (New York, **covers room and board on field trips only**)

Airfare is not included; students are responsible for flights to and from course sites and additional costs (e.g., passport and visa fees, books, supplies).

*The deposit is applied towards course tuition upon successful completion of the SEE-U Program.

Fellowships and Applying

EICES provides need-based awards in amounts up to US \$3,000 for all courses. To apply for an EICES fellowship, please fill out the fellowship section of the application. Students are encouraged to apply early for fellowship consideration.

Students in good academic standing at all accredited colleges or universities may apply.

Applicants must submit:

- Application form (available online)
- Current transcript
- Essay: 500 words describing why you would like to participate in the SEE-U program
- One letter of recommendation from a faculty advisor or instructor (past or present)
- The nonrefundable US \$25 application fee, **payable by credit card, check, or money order to Columbia University**

Non-Columbia students are responsible for confirming that credits from SEE-U are transferable and may be applied to their academic programs. If you have questions or if your academic advisor would like to speak with one of our faculty members, please call **(+1 212-854-8179)** or e-mail EICES at eices@columbia.edu.

Applications accepted on a rolling basis. Due to a limited number of spaces, students are encouraged to apply early to secure a spot in the course of their choosing.

SEE-U NYC

New York City, Hudson and Harlem Valleys, and New Jersey

6 credits, 6 weeks

Summer 2019: July 1—August 9 (tentative)

Instructor: Dr. Amanda Caudill,

Columbia University Adjunct Instructor



Blooming Hill Farm, NY



Rise & Root Farm, NY



BIGReuse, Queens, NY

The SEE-U NYC course provides students an opportunity to examine in-depth agroecosystems. The course makes use of the diverse array of farms and food systems in New York City and its surrounding environs. Lectures introduce students to the foundations of ecosystem ecology and conservation, focusing on agroecosystems such as farms, rooftop operations, pastures, grazing lands, orchards, and plantations.

The course also covers food systems, or “food to fork” pathways. SEE-U NYC couples lectures at Columbia University’s Morningside Campus with field excursions and lab exercises, allowing students to apply ecological concepts to real-world examples of agroecosystems. Field trips are conducted weekly and include visits to urban farms, small rural and peri-urban farms, and local food purveyors and distributors to expose students to the breadth of local and regional agroecosystems and food systems.

Did you know?



Two-thirds of ecosystems in the world have been converted or are managed to provide food, fuel, or fiber



In the United States, **44%** of the land is under cultivation, and yet over **12 million children** suffer from hunger and **1 in 7 households** suffer from food insecurity



By 2050, the world’s population is expected to increase by **2 to 3 billion people**. Thus, there is considerable research and debate on whether we can sustainably feed humanity.

SEE-U Jordan

Amman, Dana, Wadi Rum,
Mujib, Madaba, & Ajloun

6 credits, 5 weeks

Summer 2019: July 1—August 1 (tentative)

Instructor: Dr. Jenna Lawrence,
Columbia University



Dana



Petra



Tala Bay, Aqaba

Through a partnership between EICES and The Columbia Global Centers | Middle East, the SEEU Jordan course provides students with a unique opportunity to study ecosystems, biodiversity, and environmental sustainability in Jordan. Participants in the course learn about marine, desert, and forest ecosystems while traveling the length of the entire country, from Amman in the north to Aqaba in the south.

In Jordan, you will explore pristine coral reefs while snorkeling and study marine ecology at the Royal Diving Club, a haven for international scientists studying sub-tropical ecosystems. These reefs contain over 350 species of bony fish, rays, hard and soft corals, and turtles. Students will also explore deserts in Dana, visit forests in Ajloun, and float in the Dead Sea to develop an in-depth understanding of ecology in Jordan. Extended stays at the Royal Society for the Conservation of Nature's reserves in Dana, the Wadi Mujib canyon, and Ajloun expose students to the country's varied ecosystems and biodiversity. Cultural highlights during the program include a trip to Petra, one of the New Seven Wonders of the World.

Drawing on current issues in Jordanian resource management, the SEE-U Jordan course explores the interface between science and sustainable development. Students will learn about ecology, evolutionary biology, environmental science, taxonomy, and experimental design. Guest lecturers from government ministries and nonprofit organizations provide students with a broad understanding of current issues in sustainable development in Jordan such as freshwater resource management, desertification, biodiversity conservation, and deforestation. The centerpiece of the course is an individual research project through which students learn how to plan, execute, and present on ecological research.

SEE-U Brazil

The Atlantic Forest & Pau Brasil National Park

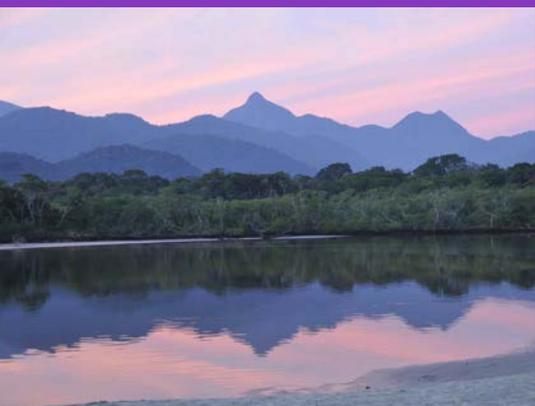
6 credits, 5 weeks

Summer 2019: June 3—July 5 (tentative)

Instructor: Dr. Tim Kittel,
University of Colorado Boulder



Rio Picinguaba



Serra Mar



Itatiaia National Park

Students participating in the SEE-U Brazil course spend 5 weeks learning about tropical forest ecology and conservation practices in the Atlantic Forest. The Atlantic Forest is geographically and ecologically distinct from the Amazon Forest. The ecosystems within this region include evergreen tropical rainforests, semideciduous tropical forests, mangroves, and high-altitude grasslands. The Atlantic Forest is one of Conservation International's 35 Biodiversity Hotspots, exhibiting both floral and faunal biodiversity and home to over 20,000 species of plants and 2,200 species of mammals, birds, reptiles, and amphibians.

In Brazil, you will visit major conservation areas in the Atlantic Forest including Pau Brasil National Park in northeastern Brazil. The park is part of the Central Atlantic Forest Ecological Corridor, a region of high biodiversity containing 60% of the primate and 50% the bird species found only in the Atlantic Forest. In this region, you will meet with leaders of an indigenous peoples reserve and a sustainable farming community and explore the beaches of Porto Seguro.

The course is hosted by Instituto de Pesquisas Ecológicas (IPÊ), one of the largest environmental non-governmental organizations in Brazil. IPÊ has over 20 years of experience in the successful implementation of mammal, bird, and landscape conservation programs and IPÊ scientists are internationally-recognized experts in species and landscape conservation. IPÊ programs serve as case studies for the SEE-U Brazil course, providing examples of successes in linking efforts to support both environmental sustainability and socioeconomic development. Members of the scientific staff interact with SEE-U students on a daily basis, serving as instructors, guest lecturers, or advisors on individual projects.

SEE-U Colorado

Land Use in the Rocky Mountains

3 credits, 2.5 weeks

Summer 2019: June 4-21

Instructor: Dr. Lisa Dale,

Columbia University Lecturer



Working ranch in Rocky Mountains



Energy development on public lands



Rocky Mountain National Park

The American West is perhaps best known for the dramatic landscapes managed through a web of federal land management agencies. Indeed, Western states have a land base that is at least 35% public, and competing interests vie for limited resources and navigate a complex bureaucracy. Less well understood are the dynamics that arise from the interactions among different land ownership categories: federal, state, and private. Working landscapes are essential pieces of the cultural heartbeat of the region. This course will focus on: 1) the history of Western settlement, highlighting the ways in which early Westerners divided up the land base and allocated resources; 2) the agencies in charge of managing federal public land including the U.S. Forest Service, U.S. Bureau of Land Management, and U.S. Park Service; 3) state land, with a particular interest in the State Land Board ; and 4) private land, including working ranches. Students will be exposed to an interdisciplinary overview of governance challenges in the West, explore the legal and regulatory framework that guides land-use decisions, and study lasting resource access conflicts.

Rocky Mountain ecosystems will serve as examples of land use concepts in practice. Moreover, the course will explore current issues in sustainable development with a focus on terrestrial resource management, including agricultural systems, recreation use, water use, timber extraction, energy development, wildlife conservation, and climate change. Students will participate in a variety of field activities including visiting federally designated Wilderness areas, visiting an oil and gas well on public lands, attending a controversial land use hearing with the State Land Board, and meeting with rural ranchers.

SEE-U Costa Rica

Agroforestry and the Ecology of Coffee

6 credits, 5 weeks

Summer 2019: May 25—June 23 (tentative)

Instructor: Dr. Mandi Caudill,

Columbia University Adjunct Instructor



Turrialba



Coffee Plantation



Jicotea

Although about one billion cups of coffee are consumed worldwide daily—most people do not link the dark, velvety liquid in their cup with the abundant plant and animal life found in regions where coffee is grown. The way that coffee farms are managed varies widely— from a monoculture of coffee plants with little to no shade trees intermixed with the crop (“sun coffee”) to farms with many different types of trees and vegetation interspersed between the coffee plants (“shade coffee”). Sun coffee often uses heavy chemical inputs and provides little habitat for wildlife, whereas shade coffee, which mimics natural forests, provides a refuge for wildlife and ecosystem services and requires fewer, if any, agrochemicals. Can coffee farms be managed in a way that protects wildlife habitat and the environment, while at the same time producing a viable, profitable crop for the farmers?

We will examine the complexities of this question through lectures and discussions, speaking with coffee farmers and researchers, and conducting our own field work. This course will explore the ecology of coffee landscapes; assess coffee certifications such as shade grown, organic, Rainforest Alliance, and Smithsonian Bird Friendly; examine socio-economic and environmental issues associated with the coffee industry; and provide insight into the challenges that farmers face and the complexities involved in defining “sustainable” coffee.

Course development for SEE-U Costa Rica is still ongoing. If you are interested in the course, please email eices@columbia.edu.