Comparative Tropical Ecology

ENVI-3005 (3 Credits / 45 class hours)

SIT Study Abroad Program:
Panama: Tropical Ecology, Marine Ecosystems, and Biodiversity Conservation

Course Description
This course focuses on understanding the principle marine and terrestrial ecosystems of Panama. Through a comparative approach, students learn about the dynamics and attributes of distinct yet interdependent tropical ecosystems. The course visits and conducts field exercises in cloud forests, lowland wet forest, coral reefs, seagrass beds, and coastal mangroves. Course curriculum is imparted through lectures, readings, and extensive field study.

Learning Outcomes
By the end of the course, students will have had the opportunity to develop:
- The ability to discuss in-depth the similarities and differences among the principle tropical ecosystems, including major flora, fauna, and biophysical processes.
- The capacity to think critically about ecosystem processes and their dependence on other natural phenomena.
- An acute understanding of ecological concepts and drivers that shape marine and terrestrial ecosystems in the tropics.

Course Schedule

Module 1: Introduction to Tropical Forests and Forest Structure
Module 1 explores the principles of tropical forests and forest structure.
- Taught by Dr. Eric Manzané, Smithsonian Tropical Research Institute
- Site: El Cope National Park, Coclé

Module 1 Objectives
The objectives of this module include teaching students to:
- Recognize the role biophysical factors play in driving biodiversity, abundance, and structure in tropical ecosystems.
- Understand how tropical ecosystems function from an ecological and evolutionary perspective.
- Comprehend general concepts of forest structure
d. Grasp tropical forest dynamics, including disturbance, succession and other processes  
e. Calculate, use, and compare distinct biodiversity indices

Module I Readings

Optional further reading:
  e. Student Handout 1A

Module I Evaluation
a. Oral presentations 50%  
b. Quiz 30%  
c. Field work and participation 20%

Module II: Seagrass and Mangrove Ecology
In the seagrass and mangrove ecology module, students will examine mangrove and seagrass bed diversity, production, phenology, and structure in the Caribbean. Module V also takes place in the Guna Yala Comarca.
  - Taught by Professor Gabriel Jacome  
  - Site: Boca del Drago, Bocas del Toro

Module II Objectives
The learning objectives for this module include introducing students to:
a. Mangrove ecosystems and dynamics  
b. Role of mangroves as nurseries of marine life  
c. Key role of seagrass beds in marine ecosystem interdependency  
d. Biodiversity in seagrass beds

Module II Readings
Please read the following articles prior to attending the module:
- Cheng A 2016 Benthic algae and diatom communities in seagrass meadows under three different human impact regimes in Bocas del Toro, Panamá. SIT Digital Collection.

Optional further reading:

Module II Evaluation
- Oral presentations 40%
- Quiz 40%
- Field work and participation 20%

Module III: Birds of the Neotropics
In Module III, students engage in field study of the birds of the lowland wet forests where the Pacific and the Caribbean meet and Central and South America come together. The convergence of so many life zones and ecological conditions makes this an ideal site to study Neotropical birds and bird diversity.
- Taught by Professor Chelina Batista, Universidad de Barcelona
- Site: Soberanía National Park, Gamboa

Module III Objectives
The learning objectives for Module III include introducing students to:
- Avian diversity of Panama
- Bird ecology in the Neotropics
- Avian migration in the Western Hemisphere

Module III Readings
Please read the following articles prior to the beginning of the module:

Module III Evaluation
- Oral presentation 25%
Module IV: Introduction to Coral Reef Ecology
Module IV takes place in the Guna Yala Comarca, an autonomous indigenous reserve on the Caribbean coast. Students spend twelve days on a small island called Porvenir learning about tropical marine ecosystems.
- Taught by Dr. Juan Maté, Smithsonian Tropical Research Institute
- Site: Porvenir Island, Guna Yala

Module IV Learning Objectives
Learning objectives for Module IV include introducing students to:
- Caribbean coral reef biology and ecology
- Identification of marine organisms and their classification

Module IV Readings
Please read the following articles prior to attending the module:
- S Andrefouet and H Guzman 2005 Coral reef distribution, status, and geomorphology-biodiversity relationship in Kuna Yala (San Blas) archipelago, Caribbean Panama. Coral Reefs 24:31-42.

Module IV Evaluation
- Analysis and presentation of data during daily reports 40%
- Quiz 50%
- Active class and field participation 10%

Module V: Mammals of the Neotropics
In the forest of the Cordillera Central in the Nusagandi mountain range of the Mesoamerican Biological Corridor, students study mammals of the Neotropics.
- Taught by Instructor Melva Olmos, Panthera
- Site: Nusagandi Mountain Range, Mesoamerican Biological Corridor

Module V Objectives
The learning objectives for module VI include introducing students to:
- Common families and species of the mammals of the Neotropics
- Ecology of local fauna in Panama and Central America

Module V Readings

Module V Evaluation
a. Oral presentations 40%
b. Quiz 50%
c. Collaboration in the field 10%

Module VI: Amphibians of the Neotropics
At the foot of the El Gaital National Monument protected area, in the cloud forest of the extinct El Valle volcanic crater, students will study amphibians of the Neotropics.
- Taught by Instructor Edgardo Griffith, EVACC Foundation
- Site: El Valle, Coclé

Module VI Objectives
The learning objectives for module VII include introducing students to:
- Common families and species of Neotropical amphibians
- Introduction to amphibian ecology
- Threats to Neotropical amphibians

Module VI Readings
- Professor Griffith will distribute additional readings.

Module VI Evaluation
a. Quiz 55%
b. Collaboration in the field 35%
c. In-class participation 10%

Evaluation and Grading Criteria

Final assessment:
Tropical Forests - Module I 18%
Birds - Module II 15%
Corals - Module III 18%
Mangroves and Seagrasses - Module IV 17%
Mammals – Module V 17%
Amphibians - Module VI 15%
Grading Scale
94-100%  A  Excellent
90-93%    A-
87-89%    B+
84-86%    B  Above Average
80-83%    B-
77-79%    C+
74-76%    C  Average
70-73%    C-
67-69%    D+
64-66%    D  Below Average
< 64      F  Fail

Expectations and Policies
Please...
- **Come prepared.** Be on time, have your readings completed and ideas in mind for discussion or clarification.
- **Complete assignments on schedule.** This will help you keep up with your coursework and ensure you don’t fall behind.
- **Ask questions in class.** Engage the lecturer. The speakers and professors you will meet are leaders in their fields in Panama. Take advantage of the opportunity.
- **Comply with academic integrity policies** (no plagiarism or cheating, nothing unethical).
- **Respect differences of opinion** (classmates’, lecturers, local constituents engaged with on the visits). You are not expected to agree with everything you hear, but you are expected to listen across difference and consider other perspectives with respect.
- **Consider your place and position in all dimensions.** Demonstrate culturally appropriate behavior and expression always.

Please refer to the SIT Study Abroad Handbook for policies on academic integrity, ethics, warning and probation, diversity and disability, sexual harassment and the academic appeal process. Also, please refer to the information available in the SIT Student Handbook.

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