

Study Abroad: The Natural History of Belize

BIZ 306/506

Syllabus (2008 version)

INSTRUCTORS:

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Profile: Dr. Gering has visited or led trips to Belize and Guatemala on several occasions (1994, 1997, 2000, 2004, 2005, 2007) and has firsthand experience with the terrestrial and marine ecosystems of Belize. He has led course-long student projects on forest structure and animal community composition and presented field and laboratory lectures on forest ecology and species diversity.

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Profile: Dr. Shinn studies aquatic invertebrates. His current research involves riverine ecosystems and aquatic invertebrates. He has taught summer courses in marine biology on the Pacific coast and is familiar with aquatic sampling techniques and the identification of larval and adult aquatic invertebrates. He co-taught The Natural History of Belize in 2004 and 2006.

COURSE MEETING TIME:

Introductory Components: There will be a mandatory organizational meeting late during the regular academic semester prior to the trip (e.g., Nov. 2007 for the May 2008 trip). At this meeting, students will hear an introductory lecture about Belize, be presented with the itinerary for the trip, and be given a list of materials relevant to travel needs (passports, visas, clothing, etc.).

Students will also be introduced to the pre-trip research requirement. Students will choose a topic relevant to the natural history of Belize (specific suggestions will be provided), conduct a literature search of that topic, and write a preliminary report about that topic. The research will form the basis for a student presentation during the trip (see Itinerary). Time and location TBA.

Field Components: The course is scheduled for May 14 –31, 2008. The entirety of the course will be spent in Belize.

Synthetic Components: There will also be a mandatory post-trip meeting during which the instructors return papers (see Course Requirements and Evaluation, below) and provide finalized species lists (e.g., bird lists, marine invertebrate lists, insect orders list, etc.). We will also use this time to exchange photographs and stories, eat a meal, and reflect on the trip. Time and location TBA.

REQUIRED TEXTS:

Kricher, J. 1997. *A Neotropical Companion: An Introduction to the Plants, Animals, and Ecosystems of the New World Tropics* (2nd edition). Princeton University Press, Princeton, NJ. 451 pgs.

Coursepack of selected literature.

OPTIONAL TEXTS:

A travel or tourist guide to Belize.

COURSE PREREQUISITES:

Academic: Biology 108, General Zoology, or General Botany (or permission of instructors).

Non-academic: Many of the activities on this trip require a moderate level of physical fitness. Activities will include walks across uneven terrain (jungle, hills, trails, etc.), and swimming (snorkeling in coral reefs and sea-grass beds). All students are expected to participate equally in packing and unpacking of group supplies, staying with the group on travel days, and respectful care and use of guest facilities where we stay. Class activities may be scheduled for irregular hours, such as early morning birding trips and after dark studies of tree frogs, etc. Ability to tolerate rainy weather and biting insects will be an advantage. Students will also be expected to exhibit patience as the Central American pace and sense of time is considerably more relaxed than that of North America. There will be travel delays, food delays, and other unforeseen delays that will require patience and a good sense of humor.

COURSE DESCRIPTION:

This course counts as a biology elective.

This two-week (but see **Course Meeting Times** above), 3 credit course emphasizes the diversity of terrestrial and aquatic organisms of Belize, including identification, adaptations, and ecological interactions. The overall goal is to expose students to a broad variety of Belizean ecosystems, and compare the diversity and adaptations of plants and animals living in these ecosystems. The course builds upon knowledge of organismic diversity introduced in our introductory biology courses for Biology majors, especially Biology 108. The course also explores the cultural diversity of Belize, emphasizing and contrasting sustainable and destructive uses of forest resources.

Belize has an extraordinarily rich variety of tropical and subtropical habitats within a small area. It is a small, politically stable, country situated just south of the Yucatan Peninsula in Central America (bordered on the north and northwest by Mexico and on the west and southwest by Guatemala). While Belize has only about 250,000 residents and is the least-populated nation in Central America, it is culturally diverse, including Mayans and descendants of English and Spanish settlers, and Mennonites.

The class will operate primarily out of scientific field stations that offer opportunities for exploring the greatest possible diversity of habitats and organisms (see Itinerary): Here is a brief description of the places we will be staying:

- The Hill Bank Field Station is situated in the subtropical forests of northwestern Belize. It is operated by *Programme for Belize*, a Belizean, non-profit organization established in 1988 to promote conservation of the natural heritage of Belize and wise use of its natural resources. It is situated near the Rio Bravo Conservation and Management Area, a 260,000 acre parcel of land representing approximately 4% of Belize's total land area. It supports a rich and exotic assemblage of biodiversity, including 392 species of birds, 200 species of trees, 70 species of mammals and 12 endangered animal species. At Rio Bravo, *Programme for Belize* seeks to link conservation of tropical forest with the development of sustainable land uses which leave the forest and its environmental values intact. Programs include scientific research, environmental education, professional training and promotion of environmental awareness amongst visitors.
- The Maya Mountain Research Farm is located two miles up river from the predominantly Kechi Mayan village of San Pedro Columbia, in Belize's southernmost Toledo district. One border of MMRF is the Columbia Branch of the Rio Grande River and the other border is the Columbia Indian Reservation. It is about a mile and a half's walk on rugged trails from the ancient Mayan ruins of Lubaantun. It is also near the Columbia River Forest Reserve, a 100,000 acre, unique, fairly pristine natural area of broadleaf forest. MMRF is a

demonstration farm that focuses on developing sustainable agricultural methods that are accessible to small-holders in the lowland humid tropics. The owners utilize traditional polycultural forest garden techniques and run trials on innovative low impact, low input practices. Using permaculture, appropriate technology, and renewable energy, MMRF has established a model agricultural system predicated on biodiversity.

- South Water Caye Marine Laboratory (operated by International Zoological Expeditions) is located on South Water Caye, a private 12 acre island approximately 15 miles off the coast of Belize and the town of Dangriga, and situated to the leeward side of the barrier reef that extends along the coast of Belize. The terrestrial environment is distinguished by island-adapted tropical plants (mangroves and palms) and surrounding marine habitats including coral reefs, mangrove swamps, and seagrass beds, each inhabited by a unique assemblage of organisms, mainly fish, invertebrates, and algae. Because of its biotic diversity, South Water Caye is designated as a World Heritage Site by U.N.E.S.C.O. and a Marine Reserve by the Government of Belize. The marine lab includes sea tables, a scientific library, chalkboard, microscopes, display specimens, and basic scientific equipment. The Caye provides access to a Smithsonian Field Station at Carrie Bow Caye.
- San Ignacio and Santa Elana are sister cities that are located on the western side of Belize near the Guatemala border. About 20,000 Belizeans of mixed ethnic origin (Creole, Mestizo, Lebanese, Chinese) reside in these two cities, making them a cultural center of Belize. They are also located near many significant Mayan archaeological sites (Cahal Pech, Caracol, Xunantunich, Chechem Hah cave) and at the confluence of two major rivers (the Mopan and Macal). This portion of the trip will constitute the major 'urban' exposure that the students will be involved in.
- Spanish Lookout is the location of the largest and most modern Mennonite community in Belize. Its 1,700 residents are a main source of poultry, dairy products, and hardware for the country of Belize. The main mission of the Mennonites is agriculture and economic development. This mission often puts them at odds with conservation groups (such as Programme for Belize, where we spend the first segment of the trip) and makes for an interesting dichotomy between land-use philosophies.

COURSE REQUIREMENTS:

Independent Research: Before leaving on the trip students will select and investigate a topic relevant to Belize. Preliminary reports about the topic will be due before the trip, additional personal research about that topic will be made while on the trip, and a final revised written report will be due after the trip.

Student Presentations: Each student will give a 30-60 minute lecture about their research topic at an appropriate time during the trip, describing the results of their pre-trip research.

Notebook: These will include the following four sections:

1. Itinerary and Schedule of Events: A brief overview of the day's events: travel, field trips, lectures, research activities, etc.

2. Notes on Lectures and Studies: This will include both lecture notes (from oral presentations by instructors, field station scientists, and fellow students) and field notes (e.g., data derived from research projects, interviews with local researchers, etc.).

3. Descriptions of Habitats and Species: Students will construct an organized account of important ecosystems and species that they encounter, including both personal observations and additional information from available references. For example, on the day they are first encountered, students would make an entry about coral reefs and describe specific aspects of reef structure that they observe. If

they see a barracuda, they would look up the scientific name and record that species and significant facts about its behavior, biology, ecology, etc.

4. Personal Reflections and Notes: Students will be encouraged to record their personal responses to various aspects of the trip (what they did or didn't like about a canopy walk, exploration of Mayan ruins, a particular jungle walk, interactions with people, etc.).

Attitude & Participation: Students will also be expected to exhibit patience as the Central American pace and sense of time is considerably more relaxed than that of North America. There will be travel delays, food delays, and other unforeseen delays that will require patience and a good sense of humor. We will observe student attitude and participation throughout the trip.

COURSE EVALUATION:

Students will be graded on a regular grading scale (not a curve). Letter grades will be determined as follows:

<u>Final Percentage</u>	<u>Final Letter Grade</u>
> 90%	A
80-90	B
70-80	C
60-70	D
< 60%	F

The final percentage (and therefore the final grade) will be based on the following components:

Independent Research Project	35%
Student Presentation	20%
Notebook.....	25%
Attitude and Participation	20%

Grades will be based on both breadth and depth of content, including the level of development of personal observations and scientific thought, and integration of observations with information presented during lectures, and printed resources. A portion of the grade will be based on participation in class activities, adherence to protocol and cooperation with the group. We will discuss requirements and grading criteria to the students at the orientation meeting (see Course Meetings Times).

The Natural History of Belize: Tentative Itinerary* (updated September 5, 2007)

Wednesday, May 14: all persons arrive STL or MCI for morning departure; check-in and meet group at the appropriate gate; receive Segment 1 Questions upon arrival at gate; depart; lunch on your own during airport stopover; depart layover airport; arrive Belize City early afternoon; clear customs (1-1.5 hr wait); transportation to Hill Bank Field Station via Programme for Belize vehicles (~2 hr ride); room assignments and settle in; dinner; *orientation to field station*.

Thursday, May 15: Leisurely wake-up; breakfast; *Forest walk and observation*; Lunch; *Forest characterization and study*; dinner and *student presentations*

Friday, May 16: *Morning birding (Gering and staff)*; breakfast; tour of nearby research sites and *field lectures by researchers (e.g., carbon sequestration study site)*; return to field station for lunch; free time; *George Shinn: riverine ecosystems and river ecology*; late afternoon river exploration (Ramgoat Creek Canoe expedition); dinner and *student presentations*

Saturday, May 17: early breakfast; departure to Lamanai Archeological Reserve; *~2 hr boat trip upstream on New River featuring lots of stops for aquatic birds, etc.*; lunch @ Lamanai; *tour Lamanai* and observe ruins; return late afternoon to field station; dinner and *student presentations*

Sunday, May 18: (travel day) *morning birding*; breakfast; pack up and depart Hill Bank for Dangriga; lunch at *JBs* along Western Highway; *visit Belize Zoo; visit primary or secondary school (pending availability)*; arrive San Ignacio mid-afternoon; settle in; dinner; discuss answers to Segment 1 Questions; receive Segment 2 questions

Monday, May 19: breakfast; pick-up by Mennonites; *tour of family occupations* (dairy, poultry production, grain mill); lunch with host families; *afternoon with host families conducting personal interviews*; pick-up at Farmer's Trading Company; transport to San Ignacio; dinner at motel; *student presentations*

Tuesday, May 20: breakfast at motel; transport to Xunantunich ruins; *guided tour*; return to motel for lunch; afternoon float trip down Macal or Mopan River; return to motel for dinner; discuss answers to Segment 2 Questions; receive Segment 3 questions

Wednesday, May 21: (travel day); *early morning birding (Gering)*; breakfast at motel; San Ignacio exploration; lunch at motel; check-out; travel to Baking Pot archaeological site to *meet with workers*; arrive Pelican Beach Resort (Dangriga) early evening; dinner at Pelican Beach; free time (you may consider doing laundry, contacting significant others)

Thursday, May 22: (travel day); breakfast at hotel; pack-up time and leisure time; leave at 10:15 for ~5 minute walk to the Dangriga airstrip; board Tropic Air flight 351 (departing at 10:50); arrive Punta Gorda; meet Dawn Dean, owner of MMRF; board charter service; lunch at Gomier's; travel to MMRF via charter bus; *orientation to MMRF*; dinner; *student presentation*

Friday, May 23: leisurely wake-up; breakfast; *tour of farm and lecture on cacao and its importance in the Mayan society*; lunch; hike to Ignacio & Zenovia Ash's house for *cacao demonstration* (fermenting, drying, toasting, grinding, drinking); lunch; return to MMRF on leisurely hike/swim (tree identification and bird watching along the way); dinner; *student presentations*

Saturday, May 24: *early morning birding with local Mayan guide*; breakfast; stream ecology and dory rides upriver to 'the source' (where the Columbia Branch emerges from its underground source); swimming and *discussion of Belizean geology*; return to MMRF for lunch; hike to Lubaantun (Classic Period Mayan Ruins); return to MMRF for dinner; discuss Segment 3 questions; receive Segment 4 questions

Sunday, May 25: (travel day) breakfast at MMRF; morning departure from Columbia San Pedro; travel by charter bus; stop at banana plantation; arrive Dangriga ~12:00PM; lunch at Pelican Beach Resort; to Southwater Caye via boat; arrive Southwater Caye later afternoon; *orientation to field station and island*; dinner; *George Shinn: marine ecology and reef structure lecture*

Monday, May 26: breakfast; *snorkel preparation including snorkeling conduct and protocol*; turtle grass bed snorkel; lunch; patch reef snorkel; dinner; *student presentations*

Tuesday, May 27: breakfast; mangrove snorkel for manatees; return for lunch; *intertidal walk* in the afternoon; dinner; hermit crab races and *student presentations*

Wednesday, May 28: breakfast; *visit Carrie Bow Caye* (if possible); return for lunch; mangrove snorkel; dinner; *student presentations*

Thursday, May 29: breakfast; shoal snorkel; return for lunch; afternoon excursion to Man O' War Caye to see rookeries and snorkel windward/leeward sides of island; return for dinner; night snorkel; free time

Friday, May 30: breakfast; morning reef snorkel; lunch; free time for packing; depart early afternoon for Belize City via boat to the Texaco station in Dangriga and then by charter bus to Belize City; arrive Belize City early evening; lodging at Radisson Fort George; eat at restaurant in motel or go in groups to other eateries; answers to Segment 4 questions; debriefing

Saturday, May 31: breakfast at motel; visit to local market or stores; lunch at motel or local eateries; depart motel at ~ 1:30 PM for Belize City airport; check-in for afternoon flight; clear customs at layover location; catch final evening flight; arrive STL or MCI in evening; disperse or check into motel for the night.

***Italics indicate structured activities wherein students will receive professional delivery of information from guides, researchers (including fellow students), faculty or local experts.**

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Syllabus Supplement: Designation and Identification of Structured and Unstructured Student Time in the Itinerary

Pursuant to Faculty Senate Bill #5397, we have developed an itinerary that is consistent with the expected ratio (1:2) of structured to unstructured time for student involvement. To do this, we assumed 12 days of biological and cultural immersion in Belize (note: this excludes two travel days and pre- and post-trip sessions) and estimated that a 'day' would represent ~12 hrs (8AM-8PM). Within each day, we scheduled ~4 hours of structured time and ~8 hours of unstructured time to be consistent with the 1:2 ratio recommended by Faculty Senate (see above) and the International Education Abroad Committee.

The actual amount of hours spent in structured and unstructured activities varies depending upon the day (see Itinerary). However, across the 12 days, we have recognized a total of 48 hours of structured time and 96 hours of unstructured time (48+96=144). Some examples of structured time include lectures by the faculty on rainforest ecology (Gering), riverine ecosystems (Shinn), and marine ecology (Bergey); guided tours of cultural (Lamanai) and research sites (Carrie Bow Caye); student lectures on research topics (almost nightly), and field identification of a range of organisms. The following activities represent unstructured time: snorkeling, self-exploration of forest and lagoons, travel time within the country, interactions with peers, and opportunities to develop independent research projects. See the Itinerary for a more complete list of these activities.

Our estimates of structured and unstructured time do NOT include pre-trip orientation sessions and time required by the students to research, develop, and write the first draft of their research paper (see Course Requirements), although it is clear that there is considerable structured and unstructured time commitments from these activities.

Our total time estimates exceed those that would be expected from a 3 credit hour study abroad course (~60 hours of unstructured time and ~ 30 hours of structured time during the course of a two-week trip), so we feel confident that we have designed a rigorous syllabus that is consistent with previous course offerings and that maintains the standard expected of Truman State University.

Syllabus Supplement: Intercultural Perspective

This course fulfills the Intercultural Perspective by offering several course components that focus on the cultural history or diversity of Belize:

1. Students may elect to research and write a paper on the culture of Belize or any of its primary cultural groups (e.g., Mayans, Garifuna, Mestizo, Mennonite, Chinese, etc.).
2. Students are required to attend a lecture on the cultural history of Belize, including historical emphasis and present demographics.
3. Students are required to visit Mayan ruins (Lamanai) and visit Mayan villages (Columbia San Pedro).
4. Students are required to interact and converse with local guides who represent different cultural groups.
5. Finally, students will be immersed in the culture of Belize for 14 days. During this time, they will be required to participate in money exchanges, food orders, and local customs.