

Course Title:	Belize: Rainforest and Reef
Instructor(s):	Dr. Marcel Pinheiro (marcel.pinheiro@uwaterloo.ca), Dr. Hugh Broders
Dates:	April 26 – May 9, 2020 (14 days)
Location:	Belize
Cost:	Estimated \$3,500 (\$350 deposit to home university; \$3,150 balance). Includes: airfares from Toronto, accommodation, surface transportation, meals. Balance: required by March 11, 2020 ; payment can be made electronically through shop.uwaterloo.ca under Field Trips & Course Fees.
Prerequisites:	Completion of second year biology program and a credit in an introductory course in ecology. NOTE: Students must be prepared for outdoor physical activities including ocean snorkelling and hiking in rainforest and mountains.
Enrolment*:	16(4) ; minimum 12
Course Description (brief):	An introduction to neotropical ecology. The main purpose of the course is to gain some familiarity with major neotropical terrestrial and marine ecosystems in Belize, evaluate conservation efforts to preserve habitats and biodiversity, and learn techniques of ecological observation. Upon arriving in Belize, we transfer to the Toucan Ridge Ecology & Education Society (T.R.E.E.S.) site in the Stann Creek district of Belize. Here we will spend time learning bird-banding, insect collecting, and mist-netting techniques, and exploring the jungle trails. Students will also design and begin work on their projects. From here we transfer to Billy Hawk marine station to spend time snorkelling on the barrier and patch reef of the area. As we return inland, we visit Cockscomb Jaguar Preserve to spot the elusive big cats of Belize. By day we will hike the waterfall trails and river tube/snorkel the area, and by night we will have guided hikes. Finally we explore the impacts of ecotourism at well-travelled Lamanai Mayan ruins archaeological site and the Belize zoo where we consider the impacts of these attractions on the local ecology. Travel will be by minibus with accommodation in well-run (though basic) field stations. An experienced bilingual naturalist / guide will accompany us throughout the trip. Students will keep a natural history journal describing the ecosystems visited and detailing the diversity in flora and fauna. At T.R.E.E.S., we will conduct mini-research projects, mainly on terrestrial ecology and biota. The itinerary and details of evaluation may be subject to change. **NOTE: Air travel will include a stopover in the United States; non-Canadian students must allow sufficient time to secure any required additional travel documents before enrolling in this course.
Evaluation:	Natural History Journal (30%) Quizzes (5%) Keystone species presentation (10%) Mini-research project (25%) Essay on neotropical ecology or biology (due June 15, 2020; 20%) Participation (10%)

An Average Day – What to Expect

(a) Daily timeline	<p>Daily schedules will fluctuate, and students must be flexible in their daily routines. All activities occur regardless of weather, and students should be prepared for rain and some cooler early morning or late evening temperatures. Early morning (before 7 am) activities may occur on several days. Generally breakfast is between 7-8am. Activities or fieldwork typically follows until lunch (typically ~12 pm), and often continues after lunch. (Some students may choose to conduct supervised fieldwork at night.) Late afternoon activities may be scheduled. Dinner times fluctuate between ~5:30-6:30pm). Activities, work on field books, or work on projects may continue into the evening. Particularly when designing group projects, it can be a late night and students may become frustrated as they tire. Near the end of the trip, student groups will present their projects orally. Instructors are on hand to help with design, but students are in control of their projects. A few evening/night trips are planned that would require students to stay up later than usual. Late evening/early morning snorkelling may be planned, as per weather. All activities are considered mandatory, unless students have spoken with instructors.</p>
(b) Work habitat & Physical exertion	<p>Conditions are rustic in the field station, but otherwise comfortable. Expect warm/humid temperatures. WiFi availability is often poor. At our main station, WiFi bandwidth is limited and students should consider it for essential services and contact with home using voice, primarily. Video/Skype/FaceTime or similar will not be permitted.</p> <p>Moderate to intense physical activity can be expected most days, including hiking or snorkelling. Students should have water containers to remain hydrated, and dress appropriately for hikes when necessary (i.e. appropriate hiking shoes, light daypack, rain jacket, water bottle, etc.). Hikes are at fair pace, sometimes at steep inclines or at high elevation, with water breaks. Insects are common and students will encounter them. Sunscreen is required. In-water activities are guided and students must be diligent to listen to instructions, as conditions vary depending on animals present.</p>
(c) Common activities	<p>Expect to walk/hike at different times of day, light and dark conditions, at various inclines, in fluctuating temperatures, and on paved and unpaved trails. Good hiking shoes are strongly recommended. Students may encounter mud.</p> <p>We will be visiting an island, which will require open-ocean travel by boat, and we may travel on a river by boat. Students may wish to have sea sickness medication. Snorkelling occurs in the ocean – life preservers available. Lycra skinsuits may be desired to avoid sun and small stinging animals, but is not required.</p> <p>Travel between destinations may require long hours on a bus, with occasional bio-breaks. Often, local stores may be available to purchase personal snacks as required.</p>
(d) Weather, dehydration, & biting insects	<p>Expect warm/hot/humid/rainy conditions. Strong sun at times. Sunscreen and regular drinks of water recommended. Monitor international weather reports for average temperatures. As we are in the neotropics, biting insects, spiders, scorpions, ticks or other invertebrates, bats, snakes, etc. can be expected. Lyme disease is not currently reported to be a concern in Belize at this time, but long clothing is generally a good idea to prevent exposure. At times when insects (mosquitos, black fly, etc.) are particularly bad, thin clothing that covers arms and legs (i.e. light pants and shirts) may be advisable. Bug repellent with DEET is highly recommended. Local guides are well versed in local fauna and capable of insuring our safety during our stay.</p>

(e) Toxic/poisonous, wildlife/ plants	Along with the usual mosquitos, black fly, “no-see-ums” and ticks, Belize is host to a wide range of animals that require your attention and respect. Both on land and in the sea, care must be taken to be alert, listen to the instructions of the guides and instructors, and travel only where instructed. Staying on marked trails is a requirement to avoid potentially dangerous encounters. In the sea, fire coral is a nuisance but easily avoided, while Scorpionfish, Stonefish and Portuguese man-of-war also require diligence. A more complete list is available at: http://www.guidetobelize.info/en_dangerous.html
(f) Sleeping, washroom & laundry facilities	Accommodations are rustic lodgings and hotels, where students can expect to share a room (3-6 per room) of the same gender. Bathrooms may be communal. Showers will have warm-hot water, but supply may be limited (particularly on island stays), and short showers may be necessary. In more rustic settings, mosquito nets may be necessary. At times, insects may enter the room. Linens/sheets are provided at accommodations and cleaned regularly.
(g) Meal plans & food allergies	Meals are typical of local cuisine, although instructors and providers will work to accommodate food allergies or preferences. Water will at times need to be purchased locally. Instructors/guides will be always ready to answer student concerns over meals/water.
(h) Non-academic responsibilities	Food is provided, but clearing of tables is required at some destinations. Students are expected to keep their living spaces tidy. Travel between destinations may require bags of communal gear to be packed for travel.
(i) Degree of isolation	<p>T.R.E.E.S. and marine stations are regularly attended by staff and researchers. T.R.E.E.S. is not far off of the main highway, but is located in the jungle. Lamani is well travelled by tourists. Electricity is mostly available. Internet/WiFi is typical of Central America, and not regularly available in some places. Low bandwidth caps at T.R.E.E.S. will likely result in poor internet/cellular service during these times.</p> <p>Students making use of Office 360, where an internet connection is always required, may choose to download offline office software to continue group work while away from internet access.</p>
(j) Alcohol & drugs	Students are expected to follow all local drug and alcohol laws and remain responsible throughout the duration of the trip. As we are travelling through the U.S., all cannabis-containing products/marijuana <u>should not be travelled with</u> .
(k) Vaccinations/ Insurances	The Government of Canada has listed Zika as a disease of concern during travel in Belize. Travel Insurance may also be considered. More Canadian Travel Advisory information available at: https://travel.gc.ca/destinations/belize
(l) Social Situations	Students will routinely share a room with other students of the same gender. Students are expected to work in groups throughout the duration of the course.
(m) Final comments	Despite the advisories above, this course offers the opportunity to explore the neotropical ecology of one of the world’s biodiversity hotspots. Seeing the flora and fauna of the neotropics in their natural setting has been a transformative experience for past students.