Module #19

Queen's University
Ontario Universities Program in Field Biology

Course Title:	**Field Methods in Ecological and Environmental Genomics**
Instructor(s):	Robert I. Colautti, Queen's University Emai: robert.colautti[at]queensu.ca; Phone: 613-533-2353; Web: https://EcoEvoGeno.org
Dates:	Sunday, August 16 to Saturday, August 28 2026
Location:	Queen's University Biological Station (QUBS), 280 Queens University Road, Elgin, ON See https://qubs.ca for more information (including contacts)
Cost:	$1,400 for accommodations, meals, and lab/field expenses ($350 non-refundable deposit to your home university + $1,050 due prior to arrival) **Includes**: Lodging, food, field trips, wet lab expenses, local travel, specialized equipment, wi-fi. **NOTE**: Students must arrange travel to/from QUBS. Students must bring**:** (1) Laptop computer with wireless internet. (2) field clothing appropriate for a variety of weather conditions from cold rain to hot sun (rain pants, sunscreen, bug spray, etc). (3) Refillable water containers with at least 2L.
Prerequisites:	Completed 2nd year university courses in Biology. Additional courses in ecology, evolution, genetics and biostatistics are an asset.
Enrolment:	12 Students (3 Queen's)
Course Description (brief):	All life on Earth is connected through shared ancestry, and understanding these connections may be the key to solving our most pressing environmental challenges. Based at the **Queen's University Biological Station (QUBS)**, this immersive field course introduces applied genetics for ecology and conservation and trains foundational skills in data analysis and experimentation in field and laboratory settings. Through hands-on activities, students will learn to design better experiments, collect and organize data, and apply genetic and statistical tools to explore the structure and function of organisms in their natural environment. Evening coding sessions will teach students how to manage, visualize, and analyze biological data, producing clear, reproducible reports. By the end of the course, students will understand how to combine field methods with genetic and data-driven approaches to inform research and conservation strategies to address the next generation of environmental challenges. **Queen's University Biological Station (QUBS)** is a world-class research facility nestled in over 3,400 hectares of protected forest and lakes in eastern Ontario. It offers unparalleled access to diverse ecosystems, including wetlands, mixed woodlands, and freshwater lakes, making it an ideal location for immersive field-based learning. Students benefit from hands-on experience in ecological research, supported by modern labs, shared accommodations, and a central operations building with cafeteria-style meals and Wi-Fi. While the setting is remote and cell service is limited, QUBS fosters a close-knit, collaborative environment where students can fully engage with nature, research, and each other. Past participants in field courses at QUBS consistently rate their experience as transformative—both academically and personally.
Evaluation:	Field & Lab Assignments (35%) Presentation (25%) Final Project (30%) Peer Evaluation (10%)

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An Average Day – What to Expect

(a) Daily timeline	This is a fully immersive field course, with typical days lasting 12 hours to cover a range of objectives. Specific activities vary each day, but an average workday begins with half- to full-day guided learning activities in a field or laboratory setting. This is followed by two to four-hour evening tutorials, discussions, and presentations lasting until 9:30 to 10:00 at night. Each day includes breakfast (7:00-8:00), lunch break (usually 12:00-13:00), and dinner (18:00-19:00) usually served in the main lodge or sometimes in the field. The last few days of the course are spent on independent projects.
(b) Work habitat & Physical exertion	Hiking around QUBS property can last for several hours across rocky terrain and muddy ground around marshes, lakes and rivers, with potential for slippery rocks and muddy conditions in a variety of cool to hot weather conditions, including rain. Injuries (e.g. sprained ankle, broken limb) are possible so students should take care when hiking and never venture out alone. Everything required for a day in the field (e.g. clothing, snacks, water, toiletries) must be packed and carried. Meals are provided but dry, odourless snacks are also recommended to maintain energy between meals. Bathrooms are available in the morning and evening but during the day students must make use of the surrounding vegetation. Students must be prepared to spend long days in the field (up to 9 hours).
(c) Common activities	Boat/canoe travel across open water using sampling equipment that can be harmful if not used correctly. Life jackets will be provided and must be worn. Boats must include a boat kit (floating rope, flashlight, whistle, bailing bucket). Hiking around QUBS hiking trails. Students should bring proper clothing (e.g. light material, long sleeve, full pants, not shorts), proper footwear and strong repellents that are effective against arachnids. Tick gaiters or long socks to tuck in pants are highly recommended to mitigate risks of tick bites and Lyme disease. Lab work may include use of toxic chemicals. Up-to-date WHMIS training is required. Disposable gloves and other safety equipment will be provided. Food and drink are prohibited in the wet lab.
(d) Weather, dehydration, & biting insects	Temperatures can vary considerably from excessively hot (>30^{o}C) to cold and wet (< 10^{o}C), sometimes for a week or more. Students should bring appropriate field clothing and dress in 'layers' that can be adjusted to ambient temperatures. Bring containers for up to 2L of water, and a variety of field clothing appropriate for variable weather conditions. Regardless of temperature, strong sun and high UV are likely. Students should bring a large sun hat and high SPF sun blocking cream to mitigate these effects. Ticks and mosquitoes in this area are vectors for several human diseases, including West Nile, Anaplasmosis, and Lyme disease. These risks can be mitigated by wearing a wide-brimmed hat, pants (not shorts) and long-sleeved shirt, sprayed with a strong insecticide that is also effective against ticks and mites.
(e) Toxic/poisonous, wildlife/ plants	Hiking trails may have poison ivy, wild parsnip, and giant hogweed, which can be mitigated by avoiding direct contact with skin (e.g. wearing long pants, long sleeves and washing clothes after field use). Black bears are also a potential risk during day hikes. To mitigate this risk, bring a loud whistle or other noise maker and avoid bringing any food with a strong smell into the field. Make noises on trails and avoid wearing headphones. Back away slowly if a bear is encountered.

(f) Sleeping, washroom & laundry facilities	Sleeping accommodations at QUBS include a bed with mattress. It is recommended that students bring their own sleeping bag and pillow to ensure a good night's rest. Shared rooms may be located within a single co-ed lodging building, depending on space availability. Field clothes should be washed or stored in plastic bags to prevent introduction of ticks into the sleeping quarters. Coin laundry is available on-site (dollars + quarters). Be sure to bring a small amount of laundry detergent to wash your clothes. Showers, sinks and flush toilets are available but may require a short walk to the main lodge (<100m). Students are responsible to keep the rooms clean to avoid attracting vermin.
(g) Meal plans & food allergies	Full meals are provided. Dietary restrictions (e.g. vegan, vegetarian, allergies) can be accommodated, but must be communicated to the course coordinator prior to arrival.
(h) Non-academic responsibilities	Students are responsible for keeping their sleeping quarters and shared areas clean. This includes clearing dishes after meals and helping with dish washing and sweeping/cleanup when asked.
(i) Degree of isolation	QUBS is large and isolated, occupying >3,400 hectare. The main lodge is fully serviced with electricity, plumbing and wi-fi/internet but no cell phone signal is available for much of the property. Students should always stick together with their assigned groups, and stay within site of the designated hiking paths at all times. The closest hospitals are more than an hours' drive, so any serious injuries can quickly become life-threating.
(j) Alcohol & drugs	QUBS is part of Queen's University and activities are therefore subject to all rules and regulations relevant to Queen's campus. Smoking of any kind is prohibited on campus. Alcohol is discouraged and strictly prohibited from common areas. Due to the increased isolation and dangers associated with work at QUBS, students must be sober for all activities and always behave responsibly; failure to do so will result in immediate expulsion from the course.
(k) Vaccinations/ Insurances	Students must have up-to-date vaccines including tetanus. Ontario residents are covered by OHIP but other students must arrange for travel insurance. Students are reminded to bring their Health Cards in the unlikely event that hospital treatment is needed.
(l) Social Situations	This is a two-week, intensive field course. During this time everyone will be engaged in full-day activities, living in close quarters and interacting with other students and researchers living and working at QUBS. A few social activities are planned in order to bond and generate lasting friendships. We must all follow Queen's Code of Conduct, which is based on the simple premise of mutual respect. There is a **zero-tolerance policy for harassment or violence** of any kind, towards any student or staff at QUBS. Any violations of this policy should be immediately reported to the course instructor or QUBS staff and could be grounds for expulsion from the course.
(m) Final comments	The main instructor (Colautti) has over 20 years of experience publishing scientific research on a range of topics (see EcoEvoGeno.org). This course was designed to help students who would like to explore the possibility of a career in research. Although this course is demanding, past students have found it rewarding, some even life-changing, with QUBS as a highlight both for its natural environment and for its professional environment—particularly the opportunity to interact with students and researchers from Canada and the United States.