

## Wilfred Laurier University

<b>Course Title:</b>	Subarctic Aquatic Ecology
<b>Instructor(s):</b>	Dr. Heidi Swanson ( <a href="mailto:hswanson@wlu.ca">hswanson@wlu.ca</a> )
<b>Dates:</b>	June 5 – June 19, 2023 (12 days in field)
<b>Location:</b>	Northwest Territories
<b>Cost:</b>	<p>Estimated \$4,000 plus airfare to Yellowknife return (\$350 deposit to home university; \$3,650 balance) plus insurance. <b>Includes:</b> meals, accommodation, float plane transportation, surface transportation.</p> <p><b>Balance:</b> required by <b>March 30, 2023</b>; payment instructions will be emailed to course registrants.</p> <p><b>Insurance:</b> It is strongly suggested that students purchase medical (can include evacuation) and travel insurance.</p>
<b>Prerequisites:</b>	<p>Completion of second year biology program and a credit in an introductory course in ecology. Aquatic ecology, freshwater ecology, or limnology course recommended.</p> <p><b>NOTE: Students must be prepared for outdoor physical activities, and to be based in a remote, fly-in northern environment with no internet, cell phone access, or showers for up to 6 days.</b></p>
<b>Enrolment*:</b>	12(4) ; minimum 8
<b>Course Description (brief):</b>	<p>An introduction to subarctic aquatic and fish ecology, including consideration of watersheds. The main purpose of this course is to gain some familiarity with features of lakes and watersheds in the Northwest Territories.</p> <p>Upon arriving in Yellowknife (students arrange own transportation to Yellowknife), students will undertake bear training and gain familiarity with ecological features of the subarctic boreal shield. Students will also undertake activities at the Prince of Wales Northern Heritage Center in Yellowknife, with a focus on learning the history of Indigenous Peoples in the territory, and the effects of historic (incl. arsenic contamination) and current (e.g., diamond) mining on northern lakes.</p> <p>A day visit to Hidden Lake Territorial Park will include practicing skills in basic field observations and note-taking. During an approximately 7-hour ground transfer to Ft. Simpson, NT, students will be introduced to broad landcover types and postglacial history of several ecoregions within the Northwest Territories. We will stop at Sambaa D'eh Territorial Park to view fossils, and discuss major fish habitat types of fluvial systems.</p> <p>After a night in Ft. Simpson, students will be transferred 4 at a time to a remote lodge at Little Doctor Lake via float plane. Here, we will spend time minnow trapping, angling, and gill netting for fish, and we will sample these fish for future contaminant analysis. We will also collect water, sediment, benthic invertebrate, and zooplankton samples for basic in-field analysis (e.g., coarse identification of benthic invertebrates) and lab analysis.</p> <p>Students will design and begin work on their independent group projects at Little Doctor Lake. An Indigenous Guardian will accompany us to Little Doctor Lake, and we will spend time discussing Reconciliation and decolonization in science. This course will also include formal and informal instruction in general field skills, including bear training, watercraft safety, fire building, meal and gear planning for remote environments, and contingency planning.</p>

	<b>NOTE: Students are responsible for booking their own air travel to and from Yellowknife. Instructor will provide a comprehensive packing list.</b>
<b>Evaluation:</b>	Field Journal (30%) Participation (15%) Reconciliation reflection short essay (20%) Mini-research project (in field) (15%) Mini-research project (final product) (20%)

### An Average Day – What to Expect

(a) Daily timeline	Daily schedules will fluctuate, and students must be flexible in their daily routines. Activities occur regardless of weather, and students should be prepared for rain, bugs (black flies and mosquitos), and cooler early morning or late evening temperatures. Early morning (before 7 am) activities may occur on several days. Generally, breakfast is between 730 and 830am. Activities or fieldwork typically follows until lunch (typically ~12 pm), and continues after lunch until late afternoon. Dinner times are ~5:30-6:30pm. Group discussions, 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 to date (final projects due after return) orally. Instructors are on hand to help with design, but students are in control of their projects. On some nights, there may be activities that require students to stay up later than usual. All activities are considered mandatory, unless students have spoken with instructors.
(b) Work habitat & Physical exertion	We will be camping for most of the two weeks, and thus conditions will be rustic. Temperatures may fluctuate from just below 0°C at night, when we are at Little Doctor Lake, to 20°C during the day. It can be rainy and windy. In Yellowknife, students will have a cell signal. During the drive to Ft. Simpson, there is no cell signal or Wifi, and at Little Doctor Lake there is neither cell signal nor WiFi. <b>**Students need to be prepared for the fact that for up to 10 of the 14 days, they will not have any access to internet or a cell signal.**</b> Parents can send emergency messages (e.g., death in the family) and instructors can arrange emergency medical evacuation via satellite communication devices, but communication with the outside world will be less than many students have ever experienced before.  Moderate to intense physical activity can be expected most days, including hiking, boating, and using equipment. Students should have water containers to remain hydrated, and dress appropriately during day excursions (i.e., light daypack (can be waterproofed with a garbage bag), rain jacket, water bottle, etc.). Walks can be at a fair pace, sometimes at steep inclines or at high elevation, with water breaks. The mosquitos and blackflies can be bad; students need to bring bug spray, a bug jacket, and Afterbite or similar. Sunscreen is required. On-water activities will be guided by an outfitter, and students must be diligent to listen to instructions, as conditions will vary.

<p>(c) Common activities</p>	<p>Expect to walk/hike/boat at different times of day, light and dark conditions, at various inclines, in fluctuating temperatures, and on rough trails. Good hiking shoes and rubber boots are strongly recommended. Students will encounter mud.</p> <p>We will be traveling on float planes (DHC-Beaver on floats), a bus, and boats. Students may wish to have motion sickness medication.</p> <p>Travel between destinations may require long hours on a bus, with occasional bio-breaks. Limited local stores may be available to purchase personal snacks as required.</p>
<p>(d) Weather, dehydration, biting insects, bears and other wildlife</p>	<p>Expect a full range of weather conditions. Students should bring layers of clothing that allow comfort between near-freezing and 20C temperatures. Strong sun at times. Sunscreen and regular drinks of water recommended. At this latitude, we will have close to 24 hours of daylight. Bring a sleeping mask as it will not be dark for long!</p> <p>At times when insects (mosquitos, etc.) are particularly bad, clothing that covers arms and legs (i.e. light pants and shirts), and especially ankles and wrists will be advisable. Bug repellent with DEET or with a new DEET-alternative (Icaridin) is highly recommended.</p> <p>A local outfitter and Indigenous guide are well versed in local fauna and capable of insuring our safety during our stay. We will likely see bears.</p>
<p>(e) Sleeping, washroom &amp; laundry facilities</p>	<p>Accommodations are rustic lodgings and tents. There are some cabins at Little Doctor Lake, which will be shared with other students of the same gender. Other students will be tenting. Students may bring their own tents or use a provided tent. Students may have to share (max 2-people in a 4-person tent) a provided tent. Bathrooms are rustic, and are usually outhouses. Showers will not be available in Ft. Simpson, and will likely not be available at Little Doctor Lake. If showers are available at Little Doctor Lake, they will be chilly! Students need to bring a sleeping bag.</p>
<p>(f) Meal plans &amp; food allergies</p>	<p>Specialty foods (e.g., gluten-free, vegan) can be extremely difficult to get in Fort Simpson. If you have food allergies or a special diet, please let the instructor know well ahead of time as groceries will need to be purchased in Yellowknife. Please keep in mind when stating sensitivities that availability of specialty foods can be very limited. We will be in the bush for much of our field course and the bush is sometimes not a very happy place for picky eaters; we simply do not have the range of foods available or kitchen facilities to accommodate preferences. Food will be simple, nutritious, and plentiful, but not everybody will like everything.</p>
<p>(g) Non-academic responsibilities</p>	<p>Food is provided, but students may have to help with cooking in the bush (this is actually a very valuable skill). Students will also be responsible for doing their own dishes. Students are expected to keep their living spaces tidy. Travel between destinations may require bags of communal gear to be packed for travel.</p>
<p>(h) Degree of isolation</p>	<p>As stated above, we will not have WiFi or a cell signal for significant portions of this course. Because of safety reasons (bears, wildlife), students will not be able to take walks on their own, which can be quite tiring for introverts. Quiet spaces will be designated for when people need to take a break. As stated above, instructors have emergency communication devices. Instructors will also send one safety message to a pre-arranged list of student parents each night.</p>

(i) Alcohol & drugs	Students are expected to follow all local drug and alcohol laws and remain responsible throughout the duration of the trip. Alcohol will not be allowed at Little Doctor Lake, for safety reasons.
(j) Social Situations	Students may be sharing a tent and/or cabin with students of the same gender. Students are expected to work in groups throughout the duration of the course.
(k) Final comments	Despite the advisories above, this course offers a unique opportunity to explore remote subarctic environments, and learn not only scientific field skills but also bushcraft. This type of field course is best suited for students who have <b>previous experience adapting to new situations</b> , including camping and challenging weather.