BIOL 350.3 SYLLABUS

Course Title: Honours Field Course Term: Q4
Course Code: BIOL 350 Course Credits: 3
Class Location: Off Campus
Class time: runs for 10 days during the last 2 weeks of August

Course Description
Students will be challenged to apply the scientific method working in the field with natural environments, species, communities, and ecosystems as found in nature. Emma Lake provides a variety of habitats and systems, including lakes, rivers and forests. Informal lectures and discussion will provide a framework for fieldwork and projects. Emphasis will be placed on gaining an understanding of the challenges of field work, including identification of organisms, the problem of quantitative sampling vs. collecting, the search for patterns and processes in natural systems, and working with data and drawing conclusions.

Prerequisites: 21 senior credit units BIOL, and restricted to students with minimum CWA of 70% overall and in Biology.
Note: This course is required in the Honours program in Biology. Enrolment is limited and priority will be given to students admitted to the Honours program in Biology. It is recommended that this course be completed after the third year of study.

Cost
Accommodation and meal fee is $600.00. This is based on a $25/night fee based on shared student-rate accommodation. Payment will be automatically assessed on PAWS and attached to your student registration fees.

Kinasao is located near the town of Christopher Lake (see map). Cabins typically house 2-5 people and there is a separate building for showers and washrooms. This building also has washing machines, so you may wish to bring some laundry soap. There is a central dining facility on the lake shore. The food is excellent and there is sufficient choice if one is a vegetarian. If for some reason you require separate accommodations, please contact Scott or Joan (see below).

***You MUST bring a sleeping bag, pillowcase, towels and snacks for your stay.**

Special Arrangements and Organization
Please let us know (Scott Halpin - 966-4493, Joan Virgl - 966-4400) if you have any specific needs or requirements that need to be arranged before the course. Also let us know if you plan to take your own vehicle. However, due to limited parking, we suggest that you avoid bringing a personal vehicle if at all possible.

> Meet In Rm 221 of the biology building at 9:00 am on August 18. Baggage can be taken to the loading dock at the rear of the building to be put on the van. (see map and directions Kinasao Camp, Christopher Lake) .

Learning Outcomes
By the completion of this course, students will be expected to:

1. Be able to identify common species of plants, animals and invertebrates of forest and lake ecosystems in the boreal forest

2. Be able to explain the terms "structure" and "function" as they pertain to terrestrial and aquatic ecosystems
3. Understand how to use equipment associated with ecosystem sampling
4. Be able to apply principles of good experimental design and quantitative analysis to design a study project
5. Collaborate and communicate effectively with fellow students to complete group projects

Course Overview

The actual field work will involve**:**

1) The identification of local flora and fauna and some knowledge of their evolutionary adaptations. Students are assigned to develop a field key based on vegetative characteristics for 25 species of woody plants.

2) Study of several local systems, including a lake, a stream or river, and the forest. Trophic relationships (source of energy and energy pathways), biodiversity, and the biotic and non-biotic aspects of the systems will be emphasized. Specific areas of study will include general description of physical and community structure and identification of community members in several habitats. Quantitative sampling and methods will be introduced. There will be benthos sampling in the littoral and open water areas of a lake, plankton sampling, river sampling, and forest sampling.

Written Reports

Students will write reports on the structure and function of a forest ecosystem and of an aquatic ecosystem, emphasizing the biodiversity, trophic structure and the biotic and abiotic features of the systems. Use Odum and Smith for concepts to be considered.

Individual Project

Students will plan and conduct an individual project on a topic of special interest. The projects should take approximately 3-4 days to complete and a written report will be submitted after the end of class.

Note in the schedule below that you will be introduced to plants, the forest, the lake, and flowing water within the first few days. This is so you will be better able to identify your area of greatest interest and become aware of the methods associated with studying that part of the ecosystem. For a project, you may wish to study the abundance, distribution, morphology, or behaviour of a single species (e.g. bird, animal, plant). Or, you might decide to focus at the level of biodiversity and species richness, and do a community-level study of, for example, of insects, plankton, forbs, soil organisms, or any other group. If you have any special interests, you may wish to start planning now. It will be a challenge to design, propose and complete a good project, but that is part of the goal in this course.

Class Schedule

Tentative Weekly Schedule: Monday, August 18 - Friday, August 29

Monday - Depart Saskatoon, Christopher Lake plant tour, Collection and Plant Key . Forest Lecture.
Tuesday - Transects, equipment demo, and Forest Sampling. Emma Lake plants
Wednesday - a.m. Black Spruce Bog walk, p.m. finish forest sampling. Aquatic Lecture
Thursday - Emma Lake Sampling, shore and open water.

Friday - Cecil Ferry field trip/ river organisms. Afternoon/Evening: Start organising aquatic samples, forest biomass
Saturday - Aquatic lab work, plankton and invertebrate ID.
Sunday - Forest project calculations, aquatic calculations, plan individual projects and proposal
Monday to Thursday - **individual projects,** work on plant key & forest reports
Friday, August 29 - hand in completed assignments, **depart 10:30 AM;** lunch in Prince Albert

Instructor Information

Dr. Karen Wiebe, Office #121, phone: 966-4406, email: karen.wiebe@usask.ca
Scott Halpin

Required Resources

Recommended but not required text is Brower et al. 1998. Field and Laboratory Methods for General Ecology. WCB/McGraw Hill Publ.

Copies of other readings will be provided or posted on blackboard including Odum, E. P. 1962. Relationships between structure and function in the ecosystem. Japanese Journal of Ecology 12(3): 108-118

Other required materials

a) Essential: Field notebook - at least one hardcover notebook from University Center Shop, e.g., Wade field book, Cat. #515/8671100; other suitable books are Pico or Write-in-the-Rain
Dissecting kit
Paper and writing materials - note: write field notes in pencil
Field bag or small knapsack
Field clothing - including light jacket & warm coat and sturdy shoes
Rain gear including waterproof pants
Boots - these may get very wet
Personal toilet articles
Calculator
A flash drive (memory stick)

b) Desirable:

Hat	Gloves
Bathing suit	Compass/GPS
Clipboard	Binoculars
Mosquito net or repellent	

Other course equipment will be provided including plant presses and insect collecting and mounting supplies for anyone wishing to make personal collections, and for group or individual projects.

Several PCs will be available at the campus for communal use, but it will be convenient if you bring your own laptop for report writing. There is a flakey wireless internet connection on site, but cell phone connection is good so you might be able to use your smartphone as a internet "hotspot"

Grading Scheme

(a)	Field notebook:	15%
(b)	Project Proposal:	10%, due Wednesday August 27 to Karen Wiebe

(c) Participation/Initiative 5%
(d) Reports 45%
a) Plant Key (15%) due Friday Aug 29 to Scott Halpin
b) Forest report (15%) due Friday Aug 29 to Karen Wiebe
c) Aquatic report (15%) due Sept 8 to Karen Wiebe
(e) Personal Project 25% Due Sept 19 to Karen Wiebe

Evaluation Components

PLANT KEY (15%) hand in to Scott Halpin who will mark these. Due the last day up at camp.
Can be pictorial or text-based or a combo. See Scott for tips on acceptable formats.

FIELD BOOK (15%) hand to Karen when you hand in your Personal Project
Essentially, all I will check is that you have a COMPLETE set of raw data in your field book from the group sampling projects. Tasks can be delegated within the group, but make sure you get together sometime during each day to share/transfer data between group members. Make sure to record along with each bit of data, the name of the person in the group who collected the data. Each day, you should record the date and weather, and any other observations which may relevant to the interpretation of your data. It is good to create tables/ columns/ page numbers in your fieldbook to keep data organized and so I can find the data in order to give you marks for completeness... raw data calculations can be divided by group members (you do not need to show all the equations and raw data calculations in the fieldbook) but everyone should have a copy of, e.g. total dry biomass of each plot, plankton biodiversity from the lake, oxygen readings etc.

DATA ANALYSIS/ INITIATIVE (5%)
Do you sit back in your group and let others do the work or go the second mile to show leadership and get things done?

PROJECT PROPOSAL (10%) due the last Wednesday
Briefly (no more than 800 words) describe what you will do for your personal project. Scientific citations are not necessary but may be helpful. Start with 1-2 paragraphs of general ecological background about your topic and introduce the general question you will study. Why is this interesting? What species will you study? What is the ecological theory or rational behind it? Next state explicitly what hypothes(es) you plan to test and what your predictions are. It may be helpful to word these as a series of If..... then.... statements e.g. "If sunlight is limiting plant productivity on the forest floor, then forb biomass will be greater in tree gaps than where the canopy is closed" (the first clause is your hypothesis and the second is your prediction). Next, describe the methods briefly. Is this an observational study or an experiment? What is your sample size and sampling design? Where and when will you sample? How are you controlling for confounding variables in your protocol? Finally, state what statistical test(s) you plan to use and why. Regressions? t-tests? ANOVAs? Chisquare? Feel free to bounce ideas off the instructors.

FOREST REPORT (15%) due last day at camp
Double space and write in typical "Lab report" format, should be about 8-10 pages, not including tables and figures. NOT LONGER!!! : 1) Introduction: in 1 paragraph introduce definitions of main terms and the purpose of the study, explaining "structure" "function" and "ecosystem". 2) Methods: explain how the data were collected in sufficient detail so the study could be repeated,

but don't overkill the detail. Feel free to use figures to illustrate the layout of plots etc if it is easier to illustrate something than explain by words. 3) Results: do not present raw data. You will need to summarize the MAIN PATTERNS using averages, standard deviations or perhaps you will want to graph some biomass pyramids, or calculate biodiversity indices (see handout from Brower for some analysis tips). You DO NOT need to do any statistical tests with P-values for this report. Remember to correctly label all tables and figures. 4) Discussion: you should discuss the STRUCTURE and FUNCTION of the ecosystem, i.e., the number, biomass, and spatial distribution of species. We will not have measured the function of ecosystems directly (rates of energy flow and nutrient cycling) but something about the function, and any bottlenecks in the system, can often be inferred by the structure. Try to present the "BIG PICTURE" about how the system is organized. Refer to your own data to back this up, don't only quote generalities from textbooks. Explain why the structure exists as it does (what is it about the functioning of the system that causes it to have this structure?) Are there biotic or abiotic constraints in the system? Light? Nutrients? How will succession affect the system over time? The ODUM readings will be helpful here.

Remember that the quality of your ideas is more important than quantity. Graphing 10 zillion figures and not discussing them adequately will not get you extra marks. You will not have space in the report to ruminate about trivia such as "why are there only 2 rose plants in plot#1 but 4 rose plants in plot #2?)!! Remember you want to present the big picture of the ecosystem which will require you to sift through and condense a large amount of raw data. **Cite Odum or a few general texts or sources as appropriate, but you do NOT need to cite primary literature (journal articles) for the Forest and Aquatic reports**

AQUATIC REPORT (15%) Due to Karen on 8 September

The same format and goal as the forest report, but based on the group's Lake data (littoral zone and plankton). You may want to contrast the structure of the littoral zone versus the pelagic zone here.

PERSONAL PROJECT (25%) Due to Karen on 19 September

Length should not exceed 10 double-spaced pages (not including figures and tables and lit cited). Write the report in the style of a journal article, using the format for the journal: ECOLOGY. Pretend you would submit your work to the journal, and follow the instructions to authors, using appropriate style for headings and literature cited. Try to write in concise scientific style, avoiding wordiness and repetition. Read the handout on "report writing" for tips, I will assume you have read it and will dock marks for transgressions. Some marks will be given to consistency in style and attention to formatting.

Although some "descriptive" material is fine, your study should focus on a **HYPOTHESIS.** Strive to present and answer your hypothesis(es) clearly in your writing. You must include at least 1 test involving statistical significance of your results. You can do these using SPSS software on university computers, or using another statistical program you are familiar with. I am happy to give you help and advice with the statistics. You should include a **MINIMUM 5** citations from scientific journals (primary literature). More citations are even better. Citations from Wikipedia or the internet are not acceptable.

Late Assignments and Criteria to Pass

Due dates are firm, there is a late penalty of -10% per day (including weekends). Submit reports to my office (rm 121) or my mailbox in biology. All assignments must be submitted to pass the course

Integrity

The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals section of the University Secretary Website and avoid any behavior that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should read and be familiar with the Regulations on Academic Student Misconduct (http://www.usask.ca/university_secretary/honesty/StudentAcademicMisconduct.pdf) as well as the Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals (http://www.usask.ca/university_secretary/honesty/StudentNon-AcademicMisconduct2012.pdf)

For more information on what academic integrity means for students see the Student Conduct & Appeals section of the University Secretary Website at:
http://www.usask.ca/university_secretary/pdf/dishonesty_info_sheet.pdf