Course Outline

I remember receiving course outlines when I was a taking courses in undergrad. I also remember - very clearly - not reading course outlines that I received. Please take 10 min. to read through this outline. There is important information in here that will help you throughout the course.

Calendar Description

This course will introduce the main concepts and principles o the management of wildlife species. The course will review the fundamental principles of wildlife ecology and develop the application of those principle to the management of wildlife populations. The lab component will cover wildlife survey techniques, identification, and develop skills of wildlife data collection, analysis, and interpretation. Students will gain a working knowledge of key legislation affecting wildlife management in North America. Topics covered will include: population dynamics, animal behavior, genetics, harvest, predation, animal capture and handling, and federal species protection legislation. The lab component will introduce students to the use of R statistical software as a tool to understand the application of models in wildlife management. Note: Successful completion of introductory statistics is recommended.

Eligible Students

This course is intended for students working towards the BES in Environment and Resource Studies.

Course Goals

This course will provide an introduction to the main concepts and principles of wildlife ecology and management. Modern approaches to wildlife management and conservation often require the use sophisticated quantitative methods. This is not a statistics course; however, students will be introduced to the basic principles of quantitative ecology including study design, data collection and analysis, and simulation modeling. Understanding these basic quantitative principles will help students determine the reliability and quality of the information provided to managers and decision makers. Students will have the opportunity to explore data and model development through the lab component of the course. R is a powerful and flexible statistical software that we will use throughout the course to better understand the principles presented in lecture. Students will also collect field data on the local wildlife populations around the University of Waterloo and will develop models in lab to better understand the space use patterns of these species. Overall, it is my goal to provide you some tools to think clearly and critically about wildlife research and associated management decisions. I also want to provide you with working knowledge of R programming language and an introduction to the use and power of this tool. Computer programming is an important skill for modern ecologists. This course will provide an introduction.

Meetings

We will meet twice weekly on Mondays and Tuesdays. We will meet for the lecture portion of the course on Tuesdays from 12:30 pm to no later than 2:20 pm in AL 210. We will meet for the

computer lab portion of the course on Mondays from 8:30 am - 9:20 pm in EV2 1002A.

Field Trip

There is one off-site field trip planned for the course that will take place on on Friday November 13, 2015. The field trip is scheduled for the whole day. Specific pick up and drop off times will be provided closer to the date. We will travel to Wrigley's Corners Environmental Education Centre. During the trip students will learn bird identification, point-count methodology, population estimation, and bird capture, marking, and handling techniques. For students that cannot attend the field trip an alternative assignment will be provided. There is no cost for the trip.

Instructor Contact

The course instructor is Dr. Brad Fedy, a faculty member in UW's Department of Environment and Resource Studies. Office number: EV2-2024; phone: 591-888-4567 ext. 32706; e-mail: bfedy@uwaterloo.ca. Fall 2015 office hours are Monday from 12:00 pm to 1:30 pm. Office hours are opportunities for students to drop-in on a first-come-first-served basis. If you would like to meet and cannot make office hours, please send me an e-mail and we can find an alternative, mutually agreeable, time to meet. *Please expect, at least a 2 day turnaround for an e-mail response from me*. Sometimes it will be quicker, sometimes slower.

Electronic Delivery

The course has a dedicated web page that you can access through UW's LEARN system (`http://learn.uwaterloo.ca`). All course materials will be provided through the site and all assignments will need to be submitted through the site. I will also use the LEARN site to post general messages to the class. I encourage you all to become familiar with the site as soon as possible and to check for updates on the site on a regular basis.

Required Readings

There is no text book required for this course. Their are a modest number of required readings that expand upon topics covered in lecture. They will be made available through the LEARN site. Most of your out-of-class time will be spent on the lab component of the course.

Lab Component

The course has a mandatory lab that meets on Mondays. Attendance at the lab is required. Each week, we will work through a set of exercises. A short assignment is associated with most lab sessions. The lab sessions during the first half of the semester will focus on introducing the students to R software and programming. The second half of the semester will be focused on the two assignments that are required for the course. The first assignment will focus on the analysis of the wildlife data the students will collect throughout the first half of the semester, the second will focus on population trend assessment. Students are strongly encouraged to review the lab material in the lab manual prior to attending the lab session on Monday. All of the information required to complete the weekly lab assignments is contained within the lab manual.

Assignments

There are a suite of assignments associated with the lab component of this course. The first half of the course will focus on developing your proficiency with R software and programming. There are exercises due with most labs in the first half of the course. Labs are on Monday each week and there is an assignment associated with most weeks. These assignments are short, and in most cases, you will likely be able to complete the assignment during the allotted lab times. Additionally, all the materials required for the lab exercises in the first half of the course are provided in the lab manual. You are encouraged to review this material prior to the lab sessions. There are two lab-related assignments that will be due in the second half of the course. These assignments will be more substantial and will require you to draw on the material presented in lecture. More details on the two assignments will be provided during the course; however, they are briefly outlined here.

- ***Species At Risk Act (SARA) assignment*** - The objective of this assignment is to give students an understanding of the function and details of the Species At Risk Act. Students will be responsible for summarizing information on the history, key features, enforcement, listing consequences, and a list of candidate species for the SARA. If interested, students can examine the U.S. Endangered Species Act rather than the SARA.

- ***UW Wildlife Distribution assignment*** - We will collect location data on the local University of Waterloo populations of wildlife (e.g., Canada Geese, squirrels, crows). Students will be responsible for collecting these data during the first half of the course. We will organize the distribution of the data collection efforts during the first two weeks of the semester. During the second half we will use these data to develop distribution models to describe the patterns of wildlife habitat use surrounding the university. During our first lab session you will learn how to use maps and GPS units to record wildlife locations.

- ***Wildlife Trend assignment*** - The UW wildlife assignment will give you the opportunity to collect field data and analyze those data to assess habitat use. For the second major assignment we will use publicly available data on bird populations to estimate population trends for a number of species. I will provide more details on this assignment as the course progresses.

- ***SARA Listing assignment*** - This is a group project. The main objective of the project is to assess if a particular candidate species for listing under the SARA warrants listing. Each group will survey the relevant literature and prepare a case regarding the listing decision. The class will be divided into a minimum of 3 groups depending on class size. Individuals will be assigned to either 1) argue for listing the species, 2) argue against listing the species, or 3) determine, based on available evidence, whether listing is warranted. We can refer to these groups as the "for listing", "against listing", and "objective" groups. We will collectively choose a focal species during the course. During our final class on December 1, 2015, each group will have an opportunity to present and defend their argument. Each group will also be responsible for preparing a short report detailing their argument for the decision drawing from relevant literature. More details will be provided throughout the course.

Assessment

- Lab assignments (20%) - The lab assignments associated with first half of the course will be worth 20% of the final grade cumulatively.

- Species At Risk Act (SARA) assignment (10%) - Each student will prepare a short essay outlining the key features of the SARA or the U.S. Endangered Species Act including information on history, key features, enforcement, listing consequences, and a list of candidate species. More details will be provided throughout the course.

- Midterm Exam (20%) - The midterm examination will be held in class on November 10, 2015.

- Field Trip (5%) - Several exercises will be conducted on-site and will need to be submitted for marking.

- UW Wildlife Distribution assignment (15%) - Each student will prepare a paper on wildlife distribution modeling. The assignment must include clearly written answers to several questions regarding distribution modeling, examples of data screening, a spatially displayed representation of wildlife habitat use, and the R programming code required to generate the distribution model. More details will be provided throughout the course.

- Wildlife Trend assignment (10%) - Each student will prepare a paper assessing wildlife population trends. The assignment must include clearly written answers to several questions regarding trend assessment, explanation of data access, trend estimations, and the R programming code required to generate the model. More details will be provided throughout the course.

- SARA Listing assignment (20%) - This is a group project. The main objective of the project is to assess if a particular candidate species for listing under the SARA warrants listing. Each group will survey the relevant literature and prepare a case regarding the listing decision. The class will be divided into a minimum of 3 groups depending on class size. Individuals will be assigned to either 1) argue for listing the species, 2) argue against listing the species, or 3) determine, based on available evidence, whether listing is warranted. We can refer to these groups as the "for listing", "against listing", and "objective" groups. We will collectively choose a focal species during the course. During our final class on December 1, 2015, each group will have an opportunity to present and defend their argument. Each group will also be responsible for preparing a short report detailing their argument for the decision drawing from relevant literature. Half of the mark will be based on the in-class presentation and debate and half will be based on the report. More details will be provided throughout the course.

- There is no final examination with this course.

Academic Integrity

A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action

constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) should seek guidance from the course professor, academic advisor, or the Graduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offences and types of penalties, students should refer to Policy 71 - Student Discipline (`http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm`). Students who are unsure what constitutes an academic offence are requested to visit the on-line tutorial (`http://www.lib.uwaterloo.ca/ait/`).

Within ENV, those committing academic offences (e.g., cheating, plagiarism) will be placed on disciplinary probation and will be subject to penalties which may include a grade of 0 on affected course elements, 0 on the course, suspension, and expulsion.

Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy 70, Student Grievance (`http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm`).

ENV students are encouraged to review the material provided by the university's Academic Integrity office (`http://uwaterloo.ca/academicintegrity/Students/index.html`).

Miscellanea

Research ethics: Please note that the University of Waterloo requires all research conducted by its students, staff, and faculty which involves humans as participants to undergo prior ethics review and clearance through the Director, Office of Human Research and Animal Care (Office). The ethics review and clearance processes are intended to ensure that projects comply with the Office's Guidelines for Research with Human Participants (Guidelines) as well as those of provincial and federal agencies, and that the safety, rights and welfare of participants are adequately protected. The Guidelines inform researchers about ethical issues and procedures which are of concern when conducting research with humans (e.g. confidentiality, risks and benefits, informed consent process, etc.). If the development of your research proposal consists of research that involves humans as participants, then please contact the course instructor for guidance and see `http://iris.uwaterloo.ca/ethics`.

Note for students with disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

Religious observances: As applicable, each student needs to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.