

## **WLE 411 – Wildlife Population Dynamics Laboratory**

### **Course Description and Syllabus**

#### **Instructor:**

Dr. Erik Blomberg

Office: Room 230 Nutting Hall; Mailbox: Room 210 Nutting Hall

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Phone: 207-581-2904

Office Hours: Thursdays 11 to 12 or by appointment.

#### **Teaching Assistant:**

Alex Fish

Office: Room 232A Nutting Hall; Mailbox: Room 210 Nutting Hall

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Office Hours: Monday 10:00 – 12:00 or by appointment

#### **Number of credit hours: 1**

**Prerequisites:** Concurrent enrollment in WLE 410 or with permission.

**Class Meeting Times:** Monday (Section 1) 1:00-3:50 p.m.

Tuesday (Section 2) 12:45-3:20 p.m.

**Course Overview:** How many moose are there in Maine? What life stage limits the recovery of Atlantic salmon? Does hunting reduce the numbers of black ducks in the Atlantic Flyway? Which forest songbird populations are expected to be impacted by climate change? Understanding how animal abundance changes over time and space, and what causes abundance to change, are two subjects that are central to wildlife and fisheries management. In population ecology, we attempt to quantify these changes and explain the mechanisms behind them. This requires evaluating population size and the underlying demographic rates (survival, recruitment, and immigration/emigration) that contribute to population growth or decline. In this lab we will gain experience working with data collected in the field to estimate demographic rates using quantitative methods.

#### **Learning Outcomes:**

*Course Goals and Objectives* - In this lab we will examine the field of quantitative population dynamics. This field is complex and extremely broad, and this course is meant to introduce you to just some of the more commonly-used methods for evaluating

wildlife populations. It should therefore be thought of as an introduction to an advanced subject. With that said, my goal is for you to leave the course with the ability to expand on the skills introduced in this course as you move forward in your careers. My objectives are to provide you with practical experience analyzing data on animal occupancy, abundance, survival, population growth, and vulnerability.

*Learning Outcomes* - Successful students will leave this course better able to:

- 1) Design wildlife field studies that are useful for population monitoring and analysis
- 2) Apply quantitative methods to evaluate animal abundance, survival, population growth, and vulnerability
- 3) Critically assess other's work and provide constructive suggestions in these areas.

**Nutting 235/245 Computer Lab:** In order to use the computers in the lab, you will need a login name and password which is different from your email/mainstreet/blackboard login. If you don't already have a login for the room, or forgot your password, please see Louis Morin in room 208 Nutting (email: [lmorin@maine.edu](mailto:lmorin@maine.edu)) to obtain one. Please complete this before lab on September 11/12.

**Reference Text:** We will use the book "Estimation of Parameters for Animal Populations" by Powel and Gale as a reference text for much of the course. This book is available for free as a downloadable e-book from the author's webpage:

<http://larkinpowell.wixsite.com/larkinpowell/estimation-of-parameters-for-animal-pop>

You can also purchase a hard copy if you like for the bargain price of \$17.50 – see purchasing links on the same website linked above.

I've listed assigned chapters for almost each week of lab below. Reading the chapters in advance of lab will give you a greater depth of understanding while completing the lab exercises, and will help you to achieve higher grades on assignments and exams.

**Electronic Resources:** We will use Blackboard as the primary electronic platform for the course. You should be able to access the Blackboard Course page through your mainstreet portal or at [www.bb.courses.maine.edu/](http://www.bb.courses.maine.edu/). I will use Blackboard for posting any additional assigned readings, and for making datasets and other course materials (assignments, course syllabus, etc.) available to you. For technical assistance using Blackboard visit the IT Help Center (<http://www.umaine.edu/it/helpcenter/>) or call 581-2506.

All software required for the course will be available in the Nutting 245/235 computer laboratories, and it should also be installed on computers in Nutting 256. In general the software we use will be freeware, and you are welcome to download and install these

programs on your own computers to work on labs outside of class. I've provided links to the relevant websites on Blackboard for downloading programs. Installing software on your personal computer is optional, however, and you are 'on your own' for troubleshooting installation issues.

### **Course Requirements:**

*Grading* - Grading in this course will be split between weekly lab assignments (50 % of grade – 10 assignments worth 15 points each), a mid-term take home lab practicum (25% of grade - 75 points), and a final lab practicum (25% of grade – 75 points). All assignments are due at the beginning of class on the date listed. Late assignments will receive a 10% deduction for each day they are turned in late up to four days, at which point you will not receive credit for that assignment.

Your final grade will be assigned as follows:

A = 93.33 - 100 %  
A- = 90 – 93.32 %  
B+ = 86.67 - 89.99 %  
B = 83.33 – 86.66 %  
B- = 80 – 83.32 %  
C+ = 76.67 – 79.99%  
C = 73.33 – 76.66 %  
C- = 70 – 73.32 %  
D = 65 -69.99 %  
F = < 65%

*Lab assignments* – Most weeks we will be analyzing data in the computer lab. There will be weekly written lab assignments that correspond to each week's topic. Lab assignments will be due at the beginning of lab the following week, and will be graded according to the following criteria: 1) how closely you followed the written instructions for each assignment, 2) the clarity of writing in your response to questions and/or written assignments, and 3) the content of the materials you turn in, 4) the general quality of your work. Each lab will include a written handout that details expectations for #3. Lab assignments will be variable in their format, and may range from a series of questions to a more formal written document. In all cases I expect that you will hand in completed assignments of professional quality.

You are allowed to revise two lab assignments during the semester for up to the full number of available points. Revised assignments should be submitted directly to Alex (course TA), via email, within 2 weeks of receiving your grade on the assignment. Revised assignments will not be accepted after this 2-week period.

*Mid-term take home assignment* – The mid-term will test your ability to apply concepts that we cover in lab during weeks 3 through 6. As a take-home exam, you are allowed to use lab materials and other outside resources when completing the mid-term. However you are NOT allowed to work together with classmates on this exam. I'll interpret similarities among students' exams as cheating, and will deal with those cases according to University Policy.

*Final lab practicum* – The final practicum will test your ability to analyze mark recapture data using Program MARK, and to accurately interpret and appropriately present your results. The practicum will be completed independently during our regular class meeting time and turned in at the end of that lab period. As with the mid-term, the practicum will be open resource, meaning that you may use lab materials, online resources, etc. when completing it. However, you are NOT allowed to work together with class mates, or to copy from student work completed during previous semesters. This will be interpreted as cheating and dealt with according to University Policy.

If you have a disability for which you may be requesting an accommodation, please contact Student Accessibility Services, 121 East Annex, 581.2319, as early as possible in the term. Students who have already been approved for accommodations by SAS and have a current accommodation letter should schedule a time to meet with me as soon as possible to discuss accommodations. I also appreciate being reminded, via email, about accommodations ~ 1 week prior to any exams.

*Attendance and Participation* – **All absences must be approved prior to the date of the absence. Unapproved absences will result in lost credit for that week's lab assignment, regardless of whether you complete the lab on your own time.** If you must miss class for a legitimate professional or University-related reason (for example, a job interview, a University commitment, or attending a professional conference) please clear it with me at least 1 week prior to the laboratory date. Labs missed for health reasons may be made up with a note from a health care provider. Labs missed for approved reasons will need to be made up on your own time. Assignments for approved absences will be due two days following the normal due date.

I also expect that you will be courteous to your fellow classmates and to me during our class, and I will extend you the same courtesy.

### **Submission of Lab Assignments**

All lab assignments should be submitted electronically through the "Assignments" page on the course Blackboard site.

## Course Teaching Assistant

The teaching assistant for the course will be Alex Fish who is a PhD student in the Department of Wildlife, Fisheries, and Conservation Biology. Alex has worked with many of the analysis methods we'll use this semester, and will be available during lab to help you work through the lab exercises, outside of lab during his office hours and by appointment, will assist with grading of lab assignments, and will provide periodic instruction during lab and the WLE 410 lecture.

## Academic Honesty Statement

Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Read more from the Department of Student Affairs (<http://umaine.edu/studentaffairs/jad/>),

In this class you may find opportunity to work collaboratively on assignments, either during or outside of lab. I completely encourage you to work with and help each other in better understanding the lab materials. However, all assignments that you turn in should clearly reflect an independent effort on your part, so while you may work together while completing the labs I expect that you will each work independently while completing and producing assignments. Please do not complete a single assignment for two or more people and turn in multiple identical copies, because I cannot distinguish between collaboration and copying in that case.

I expect each of you to complete the take-home midterm exam independently, and no collaboration is allowed (this is an exam, after all). If I find similarities among two students' exams I will interpret this as cheating and I'll deal with it according to the university policies discussed above. This is also true for the end of semester practicum.

**Course Schedule Disclaimer (Disruption Clause):** *In the event of an extended disruption of normal classroom activities, such as a zombie apocalypse, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.*

**Course Schedule** – *This schedule subject to change at my discretion.*

There will be no lab meetings during week 2 (Labor Day) and week 7 (Fall Break).

**Week 1 – Aug 28, 29** – Course Introduction

**Week 2 – Sep 4, 5** – **Labor Day Holiday – no lab**

**Week 3 – Sep 11, 12** – Refresher on Lincoln-Peterson population estimation and Microsoft Excel.

**Reading:** Powel and Gale Chapter 1

**Week 4 – Sep 18, 19** – Exponential and logistic population growth.

**Reading:** Powel and Gale Chapter 2

**Week 5 – Sep 25, 26** – Time series analysis of population trends.

**Reading:** Powel and Gale Chapter 3 (note this chapter is really a pre-cursor to next week).

**Week 6 - Oct 2, 3** – Probability, maximum likelihood, and model selection.

**Reading:** Powel and Gale Chapter 4

**Week 7 - Oct 9, 10 - Fall Break – no lab**

**MID-TERM TAKE-HOME EXAM WILL BE AVAILABLE ONLINE BEGINNING ON OCTOBER 9. Will cover material from first 6 weeks of class.**

**Week 8: Oct 16, 17** - Introduction to survival estimation in Program MARK.

**Reading:** Powel and Gale Chapter 6 and 7

**MID-TERM EXAM DUE ON BLACKBOARD BY 5:00 P.M. ON FRIDAY OCT 20**

**Week 9: Oct 24, 25** - Survival estimation 2 – Introduction to the Design Matrix

**Reading:** Powel and Gale Chapter 10

**Week 10: Oct 31, November 1** - Field Lab – Distance sampling data collection

**Reading:** Powel and Gale Chapter 14

**Week 11: Nov 7, 8** – Distance Sampling Analysis

**Reading:** Powel and Gale Chapter 19

**Week 12: Nov 14, 15** – Survival Estimation 3 – Use of explanatory covariates

**Reading:** Powel and Gale Chapter 9 (Reviewing Chapter 6 would be good too!)

**Week 13: Nov 21, 22** – Survival Estimation/Program MARK review

**Week 14: Nov 28, 29** – **Lab Practicum in Class**

**Week 15: Dec 5, 6** - Stage-structured Population Models.

**List of assignment due dates:** All assignments are due to be posted on Blackboard by the beginning of class on the dates listed, unless otherwise noted.

**Week 4 – Sep 18, 19:** Lincoln Peterson Bean Abundance Spreadsheet

**Week 5 – Sep 25, 26:** Exponential and logistic growth lab assignment

**Week 6 - Oct 2, 3:** Trend Estimation Assignment

**Week 7- Oct 11:** Probability and model selection lab assignment – note this assignment will be due on the Wednesday following fall break

**Week 8 – Oct 20: Mid-Term Due by 5:00 p.m.**

**Week 9- Oct 23, 24:** Survival Analysis Assignment 1

**Week 10- Oct 30, 31:** Survival Lab 2 Assignment

**Week 10 - Nov 4:** Distance sampling data must be uploaded by 5:00 p.m. on Thursday November 4<sup>th</sup>.

**Week 12- Nov 13, 14:** Distance Sampling Analysis Assignment

**Week 13- Nov 20, 21:** Survival Lab 3 Assignment

**Week 14- Nov 27, 28:** Practicum due at end of class.

**Week 15- Dec 13:** Eider Lab Assignment due before 5:00 p.m. on Wed. Dec. 13.

**Final – there is no final exam for this course.**

## ***Sexual Discrimination Reporting***

The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination involving members of the campus, your teacher is required to report this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

**If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:**

**For *confidential resources on campus*: Counseling Center: 207-581-1392 or Cutler Health Center: at 207-581-4000.**

**For *confidential resources off campus*: Rape Response Services: 1-800-310-0000 or Spruce Run: 1-800-863-9909.**

**Other resources: The resources listed below can offer support but may have to report the incident to others who can help:**

**For *support services on campus*: Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911. Or see the OSAVP website for a complete list of services at <http://www.umaine.edu/osavp/>**