# WLDL 353 / 553

# ANALYSIS OF WIDLIFE POPULATIONS

# SPRING SEMESTER, 4 CREDITS

*Instructor:* Dr. Benjamin S. Sedinger
*Office*: TNR 342
*Office Hours*: Thurs 1:45-2:45 ( https://uwsp.zoom.us/j/3662572978 )
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*Classroom*: Lecture-synchronous online, Tues,Thurs 12:30-1:45PM
Lab-synchronous online, Tues 2:00-3:50PM

## Communication

I communicate primarily through announcements during lecture that are usually subsequently posted to Canvas. If you are someone who doesn't tune into lecture or check Canvas regularly you will miss important information that will likely affect your grade (and surprise quizzes).

## Learning Outcomes

*Goal:* This course will introduce students to the fundamental principles of population ecology, how such principles are described by basic mathematical models, how these models are related to management and conservation applications, and how to use modeling approaches to estimate parameters relevant to wildlife population dynamics.

*Students satisfactorily completing this course should be able to:*

1) Thoroughly understand the theoretical foundations of wildlife population dynamics.
2) Understand the basic principles of estimating animal abundance and vital rates.
3) Construct and interpret mathematical models of population growth.
4) Construct and interpret models of wildlife vital rates.
5) Understand and interpret the results of conservation planning tools such as population viability analysis.

## Textbook:

1. L.S. Mills. 2013. Conservation of Wildlife Populations. 2nd edition. Blackwell. [UWSP library text rental]
2. L.A. Powell and G.A. Gale. Estimation of Parameters of Animal Populations: A primer for the rest of us. 2015. [free pdf or purchase online]

**Other Course Materials**: Lecture and lab recordings, copies of PowerPoints, lecture handouts, practice problems, lab materials, and supplemental reading materials will be posted to Canvas.

**Exams:** We will have three exams during the semester, two midterms and a final exam on 20 May from 12:30-2:30PM. Each exam is worth 100 points, and the final exam is comprehensive (with a heavy focus on last third of the semester). Exams will be given through Canvas and will be a combination of conceptual and applied content. I will provide all the equations you could possibly need. They are closed- book and closed-note, all you have access to is your glorious and wonderful mind. Illness or a family emergency may be cause for re-scheduling an exam, but only if you notify me at least 24 hours ***prior to*** the exam period.

**Quizzes:** Pop quizzes will be given throughout the semester and will be announced in lecture — they will be due within 24 hours of being assigned. As with the exams, quizzes cannot be made up unless you notify me ahead of time.

**Discussions:** We will periodically have discussions during the semester about selected reading from peer-reviewed literature. Please keep up on the reading and come to class prepared for discussion (e.g. having already read and thought about the papers).

**Labs:** Most weeks we will meet for lab to go over practical examples of the topics we discuss in lecture. In other words, we'll go over how we actually build some basic versions of the types of models we talk about in class. There will be four lab assignments throughout the semester, each one worth 25 points (denoted in schedule with ***). You'll typically have one week to complete each lab assignment. You are welcome to work on the labs with other people but you must turn in your own lab write-up. Your assignments will be docked five points for every day they are late. There will also be a final lab project worth 100 points that will require you to analyze data and write up your results.

**Attendance:** University policy dictates that I take attendance during the first eight days of the semester. I will also periodically use lecture quizzes throughout the semester to take attendance — quizzes will be due by 5pm Friday the week of lecture. Performance on exams is enhanced by regular class attendance and there is a very direct correlation between attendance and final grades. Simply put, if you do not regularly attend lectures then you will do poorly in the class. Similarly, the quality of your educational experience in this course will be directly related to the amount of time you invest in classroom preparation and the extent to which you become involved in classroom discussions.

**Grading:** The final class grade will be based on the percentage of total points earned, out of the total points possible.

| Letter Grade | Percentage |
|---|---|
| A | 93-100% |
| A- | 90-92% |
| B+ | 87-89% |
| B | 83-86% |
| B- | 80-82% |
| C+ | 77-79% |
| C | 73-76% |
| C- | 70-72% |
| D+ | 67-69% |
| D | 60-66% |
| F | 0-59% |

**Getting Help:** Please do not be shy about asking for help! If you are having any trouble understanding something in class, then do not hesitate to schedule a time to meet outside of class or ask questions in class, as those problems will likely only get worse as the material becomes more complex and builds on itself.

**Tentative Lecture Schedule**

This is a tentative schedule for lectures, labs, and exams. This may be changed at any time at my discretion (Another reason to attend lectures!).

| DATE | LECTURE | LAB |
|---|---|---|
| **Section 1 - Course Introduction and Statistics** | | |
| Jan 26 | Course Introduction & history | Lab introduction |
| Jan 28 | Discussion - 1. *Zink* and 2. *McCullough* | |
| Feb 2 | Mathematical and Statistical Models | Regression*** |
| Feb 4 | Maximum likelihood and AIC | |
| **Section 2 – Population Growth** | | |
| Feb 9 | Exponential Growth | Exponential Growth |
| Feb 11 | Density Dependence | |
| Feb 16 | Logistic Growth | Logistic Growth*** |
| Feb 18 | Lotka-Volterra Models | |
| Feb 23 | Review for exam #1 | No Lab |
| Feb 25 | Exam #1 | |
| **Section 3 – Abundance Estimation** | | |
| Mar 2 | Occupancy Models | Occupancy models |
| Mar 4 | Population indices | |
| Mar 9 | Distance Sampling | Distance sampling |
| Mar 11 | Intro to mark-recapture | |
| Mar 16 | Closed capture models | Closed captures |
| Mar 18 | Ratio estimators | |
| Mar 23 | Spring Break | No lab |
| Mar 25 | Spring Break | |
| Mar 30 | Discussion and review | Ratio estimators |
| Apr 1 | Exam #2 | |
| **Section 4 – Vital Rates** | | |
| Apr 6 | Known fate models | Known-fate*** |
| Apr 8 | Nest survival models | |
| Apr 13 | Band recovery models | Band recoveries*** |
| Apr 15 | CJS models | |
| Apr 20 | Robust design | Jolly Seber |
| Apr 22 | Life Tables | |
| Apr 27 | Matrix Models | Matrix models |
| Apr 29 | Population Viability Models | |
| May 4 | Final project | Final project |
| May 6 | Final project | |
| May 11 | Final project | Final project |
| May 13 | Semester review and discussion | Final project due |
| May 20 | **Final (12:30PM –2:30PM)** | |

***** denotes lab assignment**

## University Policies (my interpretations)

**Academic Dishonesty:** Don't cheat — aside from the fact that cheating is cause for dismissal from the university, you are just short-changing yourself when you stoop to that. You're better than that, and UWSP is better than that. If you wanted an "education" where your grades, rather than your learning, was the most important thing then you should have gone somewhere else.

**Harassment**: Be cool. Nobody likes a bully or a jerk. If I see any form of harassment, whether in my classroom or anywhere else on campus, I'll report it to the Dean of Students, I've got no patience for that kind of behavior. Everybody is different, and we all deserve to be treated with respect.

**Recording:** Lecture materials and recordings for WLDL353 are protected intellectual property at UW-Stevens Point. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. You are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or share lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.