

# Quantitative Analysis of Vertebrate Populations

## Course Syllabus

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**Frostburg State University**

**Course Number:** BIOL 414

**Semester:** Fall

**Year:** 2018

### Instructor

**Dr. Daniel Hocking**, Compton 309, djhocking@frostburg.edu, 301-687-4343

### Meeting Times and Locations

**Lecture:** MW 10:00 - 10:50 AM; CCIT 127B

**Laboratory:** F 8:00 - 10:50 AM; CCIT 127B

**Office Hours:** Monday 11:00 - 12:00; Tuesday 9:00 - 11:00 AM, Wednesday 11:00 - 12:00 AM, Thursday 12:00 - 1:00 pm; or by appointment

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### Description

A survey of quantitative techniques used to describe, analyze and model vertebrate population phenomena and interactions among populations.

### Prerequisites

MATH 120 or a course in calculus, MATH 109/209; BIOL 150, 160 or 161. BIOL 340 (General Ecology) recommended but not required.

### Learning Objectives

- Gain understanding of population dynamics
- Learn how to model abundance and distribution of vertebrate populations
- Gain experience interpreting and analyzing existing population data
- Increase understanding of study design for collecting population data
- Gain experience with field methods for count data and mark-recapture
- Develop computational skills for fish and wildlife management
- Learn basic scientific programming skills in the R language

## Text

Powell, L. A., and G. A. Gale. 2015. Estimation of parameters for animal populations: A primer for the rest of us. Caught Napping Publications, Lincoln, Nebraska.

## Grades:

Task	Points	Grade
2 Exams (100 pts each)	200	A > 90%
Homework assignments	200	B = 80 – 89%
Final Exam, comprehensive	150	C = 70 – 79%
		D = 60 – 69%
		F < 60%
<b>Total possible points</b>	<b>550</b>	

Total points and assignments may change to accommodate teaching and learning objectives. Grades are still based on percentage of total points. Grades from individual assignments will be posted on Canvas, **however, the grade calculated by Canvas may be incorrect because of differences in weighting of assignments.** It is your responsibility to calculate your current grade based on the grading scheme described above.

## Laboratory

**Please note that some of our labs may be conducted at local field sites. These labs will be conducted outside so you are expected to use common sense in deciding what to wear and what to bring. You will get dirty and you will get wet during these labs.** Be prepared to spend 3 hours in areas without restrooms, if you have questions about outdoor restroom etiquette please consult leave-no-trace (lnt) principles: <http://www.lnt.org/training/educationaltraining.php>, <http://lnt.org/training/OnlineCourse/> or ask the instructor if you have specific questions. You must notify the instructor during the first week of class if you are allergic to bees or have never been stung by a bee.

## Expectation of Student Work

Student work is defined as assignments, homework, and other academic activities to be completed outside of instructional time, including reading, studying, writing, research etc. Students should expect to spend a minimum of two hours per week completing this work for each credit hour enrolled (thus 6 hours of work outside of class for a 3-credit course), although the time spent outside of class may increase based on the topic and level of the course.

## Course Topics and Schedule

The schedule will adjust based on the previous experience of students in the the class along with learning progress during the course. A rough outline of course topics follows:

1. Introduction to populations and animal distributions
2. Introduction to R and RMarkdown
3. Maximum likelihood, R Graphics
4. Linear models
5. Model selection (AIC)

6. Mark-recapture introduction
7. Closed populations
8. Open populations & survival
9. Robust design
10. Occupancy models for understanding species distributions
11. Abundance modeling from unmarked populations
12. Random and mixed effect models
13. Fecundity, demography, and population viability

### **Important dates and information**

- September 3: Labor Day - no classes
- November 2: last day to withdraw with a “W”
- November 21 - 25: no classes (Thanksgiving Break)
- December 10: last day of classes
- December 13: Final Exam 2:30 - 5:00 pm
- Email and Canvas: Access to your email and Canvas is required for this class. Check your email daily.

### **Attendance**

If you miss class, you miss whatever quizzes, exams, or activities that were administered and you will receive a zero. Attendance is critical to success. Makeup exams are extremely rare, and will likely be a different format from the original exam. However, you will be allowed to make up missed exams if you have a documented, excused absence. Additionally, if the absence was planned, you must notify me before the absence.

Documented excused absences are generally limited to the following examples: university sanctioned events (field trips, or events where the student is an athlete/performer), funerals (requires an obituary or other proof), or illness/medical emergencies (requires a doctor's note or other proof). For all of these, documentation must be provided. If a student is participating in extracurricular activities or has an excused absence, I must be notified within one week to arrange makeup assignments.

If you have an unexcused absence, you do not need to contact me. Common examples of unexcused absences are “family emergencies”, “car trouble”, and “my ride is leaving early this week.” While you may deem these as legitimate excuses, accepting them as excusable absences and allowing students to make up work will only encourage widespread abuse. Makeups of any kind are not allowed for unexcused absences.

### **Class Policies**

There will be no cell phones on the desk or in lab. You may not eat food or use tobacco products including electronic cigarettes in class or labs. Disruptive behavior (using phones, talking, etc.): I will ask you to leave if I think you are being disruptive.

“The University will not tolerate disorderly or disruptive conduct which substantially threatens, harms, or interferes with university personnel or orderly university processes and functions. A faculty member may require a student to leave the classroom when his/her behavior disrupts the learning environment of the class. A student found responsible for disruptive behavior in the classroom may be administratively withdrawn from the course.”

**Beacon Early Warning System:** all students should have a network of people who will support them in their educational journey. For that reason, the University uses a system known as Beacon, whereby your instructors and coaches, if applicable, can post notices about your academic behavior. For instance, if you are absent repeatedly from a class or are not completing assignments, your instructor may post a notice on Beacon. That information may be shared with your other instructors and/or your athletic coach. I will be

monitoring notices posted on Beacon so that you and I may address any issues before they become obstacles to your academic success.

## **Confidentiality and Mandatory Reporting**

Frostburg State University and its faculty are committed to maintaining a safe learning environment and supporting survivors of violence. To meet this commitment and comply with federal and state law, FSU requires all faculty and staff (other than the confidential employees in CAPS and Brady Health) to report any instances of gender-based harassment, sexual misconduct, relationship violence, or stalking against students. This means if you share your or another FSU student's experience with gender-based harassment, sexual misconduct, relationship violence, or, stalking, I have a duty to report the information to the University's Title IX Coordinator. The only exception to my reporting obligation is when such incidents are communicated during class discussion, as part of an assignment for a class, or as part of a University-approved research project.

Faculty and staff are also obligated to report allegations of child abuse and neglect to University Police and to Child Protective Services. This obligation extends to disclosures of past abuse even if the victim is now an adult and the abuser is deceased. My duty to report suspected child abuse and neglect extends to disclosures that are made as part of classroom discussions and in writing assignments.

If you or someone you know has experienced an incident of harassment or violence, please go to [www.frostburg.edu/titleix](http://www.frostburg.edu/titleix) to find information on reporting options and the resources and services available for support.

## **Academic Honesty**

Definition of Academic Dishonesty from your student handbook: "Academic dishonesty is defined to include any form of cheating and/or plagiarism. Cheating includes, but is not limited to, such acts as stealing or altering testing instruments; falsifying the identity of persons for any academic purpose; offering, giving or receiving unauthorized assistance on an examination, quiz or other written or oral material in a course; or falsifying information on any type of academic record. Plagiarism is the presentation of written or oral material in a manner which conceals the true source of documentary material; or the presentation of materials which uses hypotheses, conclusions, evidence, data or the like, in a way that the student appears to have done work which he/she did not, in fact, do. In cases involving academic dishonesty, a failing grade or a grade of zero (0) for either an assignment and/or a course may be administered. Students who are expelled or suspended for reasons of academic dishonesty are not admissible to other institutions within the University System of Maryland. Suspension or expulsion for academic dishonesty is noted on a student's academic transcript."

**Any violation of academic honesty will result in a zero for that graded work, and a repeat violation will result in failure of the course. Cheating will be reported and further disciplinary action may be pursued by the University Judicial Board** This includes plagiarism. I will check long answers, essays, and lab reports with plagiarism-checking software. When in doubt, just cite the source. There's nothing wrong with building on someone else's ideas, in fact it's the way progress is made in science. Just give that person credit. Even if you get some information from a website, don't cite what the website cited (unless you read that), just cite the website.

## **Persons with Disabilities**

Frostburg State University is committed to providing equal educational opportunities for students with documented disabilities. Students who require disability services or reasonable accommodations must identify themselves as having a disability and provide current diagnostic documentation to Disability Support Services. All information is confidential. Please call x4483 or visit 150 Pullen Hall for more information.