

WILD 3810 – Plant and Animal Populations

Syllabus

Credits: 3

Semester: Spring 2022

Lectures: Monday and Wednesday 10:30 AM – 11:20 AM, NR 217

Labs: Monday 2:30 PM – 4:20 PM, LSB 225

Delivery format: Face-to-face

Instructor: Dr. Simona Picardi

Contact: simona.picardi@usu.edu

Office hours: Wednesday 1:00 – 2:00 PM or by appointment, BNR 213

TA: Veronica Winter

Contact: veronica.winter@usu.edu

Office hours: Tuesday 1:00 – 2:00 PM, Quinney library (second floor)

Course Description

Population ecology is the foundation of modern wildlife conservation and management. This course introduces fundamentals of population ecology, including single-species, multi-species, age-structured, stage-structured, and spatial models of population dynamics, as well as life-history strategies. Concepts will be illustrated with real-world examples that highlight the importance of population ecology for conservation and management. The course includes traditional lectures as well as hands-on practice during labs using the software R.

Learning Objectives

By the end of this course, you will be able to:

1. Explain general concepts of plant and animal population dynamics using appropriate terminology;
2. Use mathematics and computer software to examine and predict dynamics of plant and animal populations;
3. Think critically about questions in population ecology and give answers based on quantitative approaches.

Prerequisites

1. WATS 2220 or BIOL 2220;
2. MATH 110 or higher (C- grade or better);
3. STAT 2000 or STAT 3000 (C- grade or better)

Instructional Methods

The course will be articulated in lectures, labs, homework, and a final exam.

Lectures: Each week, we will meet twice for one hour at a time to cover theory and concepts.

Labs: Each week, we will meet once for two hours to practice hands-on exercises that apply the concepts covered during lecture.

Homework: You will be expected to complete one reading, one quiz, and one assignment per week.

- **Readings:** Readings will be assigned from our textbook or provided in .pdf format.
- **Quizzes:** Quizzes will focus on topics covered during lecture and/or readings and will include a mixture of multiple choice and short-answer questions.
- **Assignments:** Assignments will require solving applied problems using math and code in R; each week, the lab will cover a similar problem to that week's assignment to prepare you to tackle the exercise at home.

Final exam: The course will conclude with a final exam on topics covered throughout the semester.

Course Resources

Textbook: Mills, L.S. 2013. Conservation of Wildlife Populations: Demography, Genetics, and Management. Second Edition. Blackwell Publishing, Malden, MA. ISBN: 978-0-470-67149-8

Canvas: Canvas is the Learning Management System that we will use for our course. We will be using Canvas's Quiz, Assignment, and Announcement tools. The Discussion tool can be used among students to discuss labs and lectures, but should not be used to exchange results pertaining to lab assignments, quizzes, or final assignments.

Course materials: I will share .pdf copies of lecture slides prior to each lecture and any files required for labs prior to each lab on Canvas.

Software: Students should have access to a computer with the software R and RStudio installed. Both of these are free and open source, and will need to be installed separately. For instructions on how to install R, see: <https://ecorepsci.github.io/reproducible-science/index.html#r>. For instructions on how to install RStudio, see: <https://ecorepsci.github.io/reproducible-science/index.html#rstudio>. If you do not have access to a personal laptop or desktop computer, you may complete your homework assignments on lab computers.

Course Schedule

Part I: Unstructured Population Dynamics

Week 1

- Welcome, logistics
- LAB: Intro to R
- Introduction to population ecology

Week 2

- *MLK Day*
- Review of R concepts

Week 3

- Abundance estimation
- LAB: CMR and Lincoln-Peterson
- Density-independent population growth

Week 4

- Stochasticity
- LAB: Density-independent models
- Density-dependent population growth

Week 5

- Small populations
- LAB: Logistic growth and the Ricker model
- Review: Unstructured populations

Part II: Structured Population Dynamics

Week 6

- Age-structured populations
- LAB: Life tables
- ***Midterm 1: Unstructured populations***

Week 7

- *President's Day*
- Survival estimation

Week 8

- Reproduction
- LAB: Cormack-Jolly-Seber
- Stage-structured populations

Week 9

- *Spring break*

Week 10

- Matrix population models
- LAB: Matrix population models
- Reproductive value, sensitivity, and elasticity

Week 11

- Life history variation
- LAB: Elasticity analysis
- Review: Structured populations

Part III: Spatial population dynamics

Week 12

- Metapopulation dynamics
- LAB: Metapopulation models
- ***Midterm II: Structured populations***

Week 13

- Source-sink dynamics
- LAB: Occupancy models
- Review: Spatial dynamics

Part IV: Species interactions

Week 14

- *No class*
- Competition

Week 15

- Competition
- LAB: Lotka-Volterra
- Predation

Week 16

- Review: Species interactions
- Final review

Course Policies

Attendance

If you are not able to attend class, please let me know as early as possible (applies to lectures and labs).

Grading

Assignments will be worth 40% of the final grade, quizzes will be worth 30%, and the final exam will be worth 30%. Assignments and quizzes will be due every Sunday at midnight. There will be an automatic 10% deduction per day for late assignments. After 10 days, unjustified missing assignments or quizzes will receive a grade of 0. If you are unable to hand in an assignment because of extenuating

circumstances, please contact me and we will discuss options. At the end of the semester, I will drop the lowest-score assignment from the final grade calculation (does not apply to quizzes). Assignments will be graded following a rubric that I will share with the class after the assignment is due. **There will be no opportunities for extra credit.**

Final grades will be assigned based on the following standards:

Grade	Range
A	100 % to 93.0%
A-	< 93.0 % to 90.0%
B+	< 90.0 % to 87.0%
B	< 87.0 % to 83.0%
B-	< 83.0 % to 80.0%
C+	< 80.0 % to 77.0%
C	< 77.0 % to 73.0%
C-	< 73.0 % to 70.0%
D+	< 70.0 % to 67.0%
D	< 67.0 % to 60.0%
F	< 59.0 % to 0.0%

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at <http://libguides.usu.edu/rc>.

Classroom Civility and Code of Conduct

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read [Student Code Article V Section V-3](#) for more information.

University Policies & Procedures

COVID-19 Classroom Protocols

In order to continue to provide a high standard of instruction at USU, and to limit the spread of COVID-19 during the pandemic, students are asked to follow certain classroom protocols. These protocols are in place not only for your safety but also the safety of the rest of the campus community. You will be asked to clean your desk area at the start of each class, sit in designated seats, wear face coverings, and follow dismissal instructions. There may be individual medical circumstances that prevent some

students from using face coverings. These circumstances will be rare, but if they do exist, we ask that everyone be respectful. It is imperative that we each do our part so that on-campus instruction can continue.

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. [Faculty Code Policy #403](#) further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code. Acts of academic dishonesty include but are not limited to:

- Cheating: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
 - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually;"
 - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
 - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
 - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
 - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
 - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- Falsification: altering or fabricating any information or citation in an academic exercise or activity.

- Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: [ARTICLE VI. University Regulations Regarding Academic Integrity Sexual Harassment/Title IX](#)

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and [USU Policy 339](#) address sexual harassment in the workplace and academic setting. The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU's [Affirmative Action/Equal Opportunity \(AA/EO\) Office](#) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment ([USU Policy 305](#)), and has designated the AA/EO Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the [Disability Resource Center \(DRC\)](#) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: <https://studentaffairs.usu.edu>, (435) 797-1712, studentservices@usu.edu, TSC 220
- Student Legal Services: <https://ususa.usu.edu/student-association/student-advocacy/legal-services>, (435) 797-2912, TSC 326,
- Access and Diversity: <http://accesscenter.usu.edu>, (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: <http://accesscenter.usu.edu/multiculture>, (435) 797-1728, TSC 315
- LGBTQA Programs: <http://accesscenter.usu.edu/lgbtqa>, (435) 797-1728, TSC 3145
- Provost's Office Diversity Resources: <https://www.usu.edu/provost/diversity>, (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State
University: <https://studentconduct.usu.edu/studentcode>

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: [Article VII](#).

Full details for USU Academic Policies and Procedures can be found at:

- [Student Conduct](#)
- [Student Code](#)
- [Academic Integrity](#)
- [USU Selected Academic Policies and Procedures](#)
- [USU Academic Policies and Procedures](#)
- [Academic Freedom and Professional Responsibility Policy](#)

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.

Mental Health

Mental health is critically important for the success of USU students. As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Utah State University provides free services for students to assist them with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available on campus at [Counseling and Psychological Services \(CAPS\)](#).

Students are also encouraged to download the “[SafeUT App](#)” to their smartphones. The SafeUT application is a 24/7 statewide crisis text and tip service that provides real-time crisis intervention to students through texting and a confidential tip program that can help anyone with emotional crises, bullying, relationship problems, mental health, or suicide related issues.