University of Regina

Population and Community Ecology
BIOL 376
Winter 2026

This course will explore the major processes governing population dynamics, species interactions, and community structure. Throughout the course, I will emphasize quantitative methods for understanding populations and communities using mathematical models and graphical analysis. Important concepts will be presented using R scripts as a way to introduce computational tools for implementing ecological models.

Instructor

Dr. Mark Vanderwel (LB248; mark.vanderwel@uregina.ca; office hours: by appointment)

Prerequisites

BIOL 275, CS 110, and one of MATH 111 or MATH 112.

Lectures

Tu, Th 10:00 – 11:15 in ED561

Course Website

A UR Courses site will be continually updated with lecture notes, R scripts, assignments, and other material: https://urcourses.uregina.ca/login/index.php

Textbooks

Required:

Gotelli, NJ. 2008. A primer of ecology (4th ed). Sinauer.

Recommended:

Case, TJ. 2000. An illustrated guide to theoretical ecology. Oxford University Press.

Mittelbach, GG. 2012. Community ecology. Sinauer.

(Both recommended texts are on library reserve for the course.)

Software

You will implement ecological models in the R programming language both in lectures and assignments. It is recommended that students download and install the following free software to

complete assignments for the course. It is also installed in the U of R computer labs, and will be used regularly during lectures.

R: http://cran.stat.sfu.ca/

R Studio (Desktop version): https://posit.co/download/rstudio-desktop/

Grading Scheme

Attendance / participation	10%
Readings	5%
Assignments (×4)	25% (4%/7%/7%/7%)
Midterm exam	25%
Final exam	35%

Important Dates

Jan 6	First day of lectures
Jan 20	Assignment 1 due
Feb 5	Assignment 2 due
Feb 16-20	Winter break (no classes)
Feb 26	Midterm exam (in class)
Mar 17	Assignment 3 due
Apr 7	Assignment 4 due
Apr 9	Last day of lectures
Apr 16*	Final exam (9:00-12:00)

*Note: Subject to change. Please consult the final exam schedule to confirm exam date and time.

Assignments and Readings

Each assignment will contain a series of questions that require you to modify the R scripts that are presented during lectures. You will not need to write new code from scratch, but you will need to understand how the models are implemented so that you can edit existing scripts to extend models in various ways. We will spend ample time in class learning how these scripts work, along with the basic syntax and commands of the R language. The first assignment will be worth 4% of your final grade. Each of the other assignments will be worth 7%.

Readings will be assigned throughout the course. You will be required to read and hand in a one-paragraph summary of each reading before class, which will be graded on a pass-fail basis. Each reading will form the basis for an in-class group exercise that applies concepts taught in lecture to a particular case study.

Late Penalties

All assignments are due at 8:30am on the dates listed above. A 10% per day penalty will be applied to any assignments handed in late.

Final Exam

Students are required to write the final exam to pass the course. “Deferred” final exams are granted only by the Assistant Dean, Undergraduate (for Faculty of Science students), or by the Deans and/or Assistant Deans of other Faculties of Federated Colleges of the University Regina. There are no exceptions.

Use of AI

Students are permitted to use generative AI tools on assignments for this course only as indicated by the instructor and outlined on this syllabus. Without such permission, students are expected to complete all coursework without substantial assistance from others, including automated tools.

The use of generative AI tools in the preparation or completion of reading summaries, in-class group exercises, and examinations for this course is strictly prohibited.

For the four assignments, students must choose either a “No use of generative AI” or “AI-assisted” option.

If you choose the “No use of generative AI” option for an assignment:

- Use of generative AI tools is strictly prohibited.
- I will apply a lenient grading standard. This means that I will award partial credit for incorrect answers if you’ve demonstrated progress towards the correct solution.
- If there is evidence that generative AI was used, you will be given a tentative grade of zero for the assignment and the case will be referred to an Investigating Dean for potential academic misconduct.

If you choose the “AI-assisted” option for an assignment:

- Use of generative AI tools for assistance is permitted.
- You are responsible for critically evaluating and adapting AI-generated content, and for ensuring that submitted work represents your own comprehension and effort.
- I will apply a strict grading standard. Errors in answering individual questions, even minor ones, will result in a mark of zero for that question.

List of Topics

- Density-independent population growth
- Density-dependent population growth
- Age- and stage-structured growth
- Life history strategies
- Spatial population dynamics
- Predator-prey interactions
- Epidemiology
- Harvesting

- Competition
- Species co-existence
- Neutral drift
- Dispersal

Student Conduct

Students of the University of Regina are expected to conduct themselves responsibly and with propriety both in their studies and in their general behaviour, and are expected to abide by all policies and regulations of the University of Regina. Misconduct, which may be academic (that is, in academic studies) or non-academic (in general behaviour), is subject to disciplinary action.