science | YORK UNIVERSITÉ UNIVERSITY

BIOL 3171: *Population Ecology* (3 credits)

Course Instructor: Gordon Fitch Hear my name

How to address me: Dr. Fitch, Professor Fitch, Gordon

Pronouns: he/him

Email: gmfitch@yorku.ca

If you have questions or would like to talk with me, you can approach me after class, send an email, or visit me during office hours (see below).

Office Hours: Monday 11:30-12:30 and Wednesday 1:30-2:30, in my office or via zoom.

If these times don't work for you, email me and we can arrange an alternate time to meet.

What are 'Office Hours'?
Student hours are dedicated times through the week for the course instructor to meet with YOU. They are a great way to make personal connections with instructors. Please pop in to introduce yourself, ask questions about the course, or discuss content from the course or other topics.

Office Location: Lumbers 204

Click here for visual directions.

Course Format: *in person*; lectures will usually be recorded and made available on eClass, but attendance in person is expected

Prerequisites: BIOL 2060 3.00 and BIOL 2050 3.00 or 4.00.

Course Credit Exclusion: BIOL 3170 3.00

Class Times: Monday, Wednesday, 10:30 am – 11:20 am

Class Location:

Life Sciences Building (LSB) 107

Click here for visual directions.

Lab Time: Monday 2:30 – 5:20 pm (LAB 01) or Wednesday 2:30 – 5:20 pm (LAB 02)

Lab Location: Lumbers (LUM) 128

Study Spaces on Campus:
https://currentstudents.yorku.ca/study-spaces

Course TAs:
Lab 01: Ibrahim Ahmad (he/him) - ibra123@yorku.ca
Lab 02: Audrey Khani (she/her) – khaniaudrey@gmail.com

Course Outline Table of Contents:

Land Acknowledgement

York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, and the Huron-Wendat. It is now home to many First Nation, Inuit, and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the Credit First Nation. This territory is subject of the Dish with One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

Welcome to Population Ecology!

Course Description: Using lectures and labs, this course explores the dynamic and changing field of population ecology, focusing primarily on demographic traits of populations and patterns of population growth and change. Topics to be investigated include temporal and spatial dynamics of populations; constraints on the distributions of populations; patterns of population growth and regulation; density dependence and density independence; vital statistics and life history biology; age and sex structure of populations; meta-populations and dispersal; and the genetic attributes of populations. Labs provide experiential exposure to several of the topics developed in lectures. Two lecture hours and three lab hours per week.

Course Learning Objectives:

Upon successful completion of this course, you should be able to…

1. Demonstrate a fundamental understanding of population ecology:

- Use terminology appropriate to the field of population ecology
- Distinguish different models of population growth and apply them to real populations
- Recognize the main parameters and major formulae for modelling population growth
- Distinguish between r- and K-selected traits and connect them to life history strategies and growth patterns
- Apply the principles of population ecology to issues of conservation
- Interpret population patterns in terms of evolutionary selective forces and evolutionary mechanisms applicable to small populations
- Contrast different forces generating patterns of dispersal and spatial distribution
- Extend population ecology fundamentals to the concept of meta-populations
- Apply population ecology principles to wildlife management challenges
- Execute procedures to collect data to test a hypothesis related to population ecology

2. Think critically:

- Employ case studies as exemplars of biological concepts
- Draw generalized concepts from the results of particular scientific studies or experiments (inductive reasoning)
- Present arguments that explain evolutionary phenomena such as life history trait diversity
- Employ metaphors for conveying the principles of population ecology
- Analyze lab- or field-generated data in order to evaluate a population ecology hypothesis
- Assess the effectiveness of experimental designs in answering questions about population dynamics

3. Solve problems:

- Apply principles and models from course materials to new situations
- Employ diverse field or lab methods for collecting data to address particular questions in population ecology

4. Communicate effectively:

- Clearly communicate concepts in population ecology using multiple modalities, including orally, pictorially and in writing
- Summarize the findings from lab or field studies and communicate them orally and in writing

Inclusive teaching statement:

I love studying ecology, and I'm hoping you will too. I am committed to fostering an environment for learning that is inclusive for everyone regardless of gender identity, gender expression, sex, sexual orientation, race, ethnicity, ability, age, class, etc.-Please let me via know email or in person about any exeriences you have related to this class that have made you feel uncomfortable. I would also very much appreciate any suggestions you have for improving the course… no need to wait until the end of the semester!

Learning Materials

Readings: There is an *optional* textbook for this course. It is available for purchace from the YorkU bookstore as an ebook, and may be available elsewhere. Other readings, if applicable, will be made available on eClass.

> **Optional textbook:** Larry L. Rockwood (2015). *Introduction to Population Ecology, 2nd Edition*. Wiley-Blackwell.

Website (eClass): https://eclass.yorku.ca/

- Lecture slides will be posted after each lecture.

- Please check the course eClass site often for important information and updates.
- Important information will be sent out through course announcements. Please make sure you receive course announcements to your email & check your email often.
- If you miss a class, check the "Announcements" slides at the start of each lecture ASAP. Not all of the information in the announcement slides will be sent out as course announcements.

Technology Checklist:

 An internet-enabled computer	 Access to reliable internet	 RStudio (free download)

Note: *If you don't have access to a computer, consider borrowing a laptop from York U, financial aid from York, and single workspaces available for student use on campus at the library.*

Communication

Feel free to reach out to me via email (gmfitch@yorku.ca) with any questions or concerns. **Please begin your subject line with "[BIOL 3171]", followed by a brief description** (e.g., "question about lecture 3"). **Please allow up to 2 working days for a reply.** If you don't hear from me after 2 working days, please email again.

Assessment in this Course

Research about learning strongly suggests that the most important factor in learning is doing the work of reading, writing, recalling, practicing, synthesizing, and analyzing. Learning happens best when people actively engage material on a consistent basis, and that is why we have high standards in this course. I am confident that, with appropriate effort, you **all** can meet those standards.

When possible, we will reduce unintentional bias in grading by, for example, grading assignments one question at a time (grading all of question 1 before grading any of question 2), grading anonymously, and using rubrics. These also help improve consistency in marking.

Grade Breakdown

COMPONENT	GRADE VALUE
LAB WRITE-UPS	50%
PARTICIPATION	10%
MIDTERMS	20%
FINAL EXAM	20%

Labs

You will complete 6 labs in this course. Of these, 2 are field-based, in which you will collect and analyze data to answer a question related to population ecology. The others are simulation-based, and you will use a combination of RStudio and pencil-and-paper to complete them. Write-ups are due on the day of your lab section for the week listed in the schedule (i.e., if you attend Monday's lab, your write-ups are due Monday; if Wednesday's lab, Wednesday).

For field-based labs, please dress for being outside in brushy areas (long pants and close-toed shoes recommended). For all labs, please bring a laptop or tablet.

You are encouraged to work with your classmates on lab assignments, but each person is responsible for writing their own writeup.

Late policy:

Labs 1, 2, 5 & 6: You will be peer-grading these assignments at the beginning of lab on the day these are due, so it is important that you have the assignment completed in time and *bring it to lab*. Many of you should be able to finish these assignments during lab time. Because you will be provided with an answer key during the lab, **late assignments for these labs will receive at most 50% of the total grade.**

If exceptional circumstances mean that you cannot submit one of these labs on time, **let your TA and me know with as much advance notice as possible, via email.** In your email, provide **a *brief* explanation for why you will be submitting the assignment late** (no need for doctor's notes or other "proof"). We will do our best to accommodate, but no promises.

Labs 3 & 4: For these labs, I would prefer you hand in excellent work a bit late than mediocre work on time. If you anticipate not being able to hand in an assignment on time, **let your TA and me know with as much advance notice as possible, via email.** In your email, provide **a *brief* explanation for why you will be submitting the assignment late** (no need for doctor's notes or other "proof"), and **tell us when you plan to submit the assignment.** Extensions up to 5 days will usually be granted without any question… but remember that more assignments are coming. Don't let them pile up!

If you do not let us know in advance, late assignments for labs 3 & 4 will receive a penalty of 5% for each day they are late.

LAB	GRADE VALUE	DUE
1: INTRO TO RSTUDIO	5%	Week of Sept 16, before lab
2: POPULATION GROWTH	5%	Week of Sept 30, before lab
3: SNAIL POPULATION BIOLOGY	15%	Oct 23, 11:59PM
4: GOLDENROD GALL TROPHIC INTERACTIONS	15%	Nov 6, 11:59PM

5: STRUCTURED POPULATIONS	5%	Week of Nov 18, before lab
6: METAPOPULATIONS	5%	Week of Nov 25, 11:59PM

Participation

This course relies on your consistent attendance and participation. Lectures will be interactive, including structured activities, questions from me that you will be expected to discuss with a classmate, and opportunities to ask questions you have. Labs will involve collaborating with classmates to gather and analyze data and work through simulation exercises. For full participation credit, plan to attend all course meetings and actively participate. If you are unable to attend a lecture, please email me (gmfitch@yorku.ca) to let me know. If you are unable to attend a lab, please email your TA. It may be possible to switch lab sessions for a given week, but you will need to confirm in advance with your TA.

Midterms – Wednesday Oct 9 & Wednesday Nov 13, during lecture

Midterms will be in-person. They are **designed to take approximately 30 minutes**, but you will have the full 50-minute class period to complete it. Midterms will consist of short-answer and problem-solving questions. You will be provided with a sheet of all relevant equations; no other materials are allowed in the exam. More details will be provided in class and on eClass closer to the midterm dates.

Missed midterm policy: If you miss a midterm for any reason, you do not need to bring physician's documentation. Please email me (gmfitch@yorku.ca) as soon as possible. In most cases, the weight of midterm will be assigned towards the final exam.

If your final exam score is higher than one or both midterm scores, the final exam score will automatically replace the midterm score(s) for this component of your grade.

Final Exam

The final exam will take place ***in person*** during the Final Exam period as scheduled by the Registrar's Office. You will be provided with an equation sheet; no other materials are allowed in the exam.

Regrading/Reappraisal Procedures

Please submit regrading requests via the reappraisal form on eClass. In this form you'll be asked to include (1) your name and student number, (2) the reason for the request (e.g., the total was miscounted), and (3) a copy of the assessment. We will strive to review all re-grading requests within 3 weeks. If you think your work was marked incorrectly, point (2) above should include a rationale for regrading based on academic merit (i.e., an explanation as to why marks were deducted unfairly). Note that re-marking can result in the mark being raised, confirmed, or lowered and the grade from a remark/reappraisal is final.

Please note that in fairness to all students in the course, final grades are **NOT** negotiable and will not be "bumped up" to a higher grade bracket. Individual 'extra credit' assignments are not available during or after the course.

Community Guidelines

The following values are fundamental to academic integrity and are adapted from the International Center for Academic Integrity*. In our course, we will seek to behave with these values in mind.

	As students, we will...	As a teaching team, we will...
Honesty	• Honestly demonstrate our knowledge and abilities on assignments and exams • Communicate openly without using deception, including citing appropriate sources	• Provide honest feedback on your demonstration of knowledge and abilities on assignments and exams • Communicate openly and honestly about course expectations and standards
Responsibility	• Complete assignments on time and in full preparation for class • Show up to class on time, and be mentally and physically present • Participate fully and contribute to team learning and activities	• Provide timely feedback on your assignments and exams • Show up to class on time, and be mentally and physically present • Create relevant assessments and class activities
Respect	• Speak openly with one another, while respecting diverse viewpoints and perspectives • Provide sufficient space for others to voice their ideas	• Respect your perspectives even while we challenge you to think more deeply and critically • Help facilitate respectful exchange of ideas
Fairness	• Contribute fully and equally to collaborative work, so that we are not freeloading off others • Not seek unfair advantage over fellow students in the course	• Create fair assignments and exams, and grade them in a fair and timely manner • Treat all students equitably
Trust	• Not engage in personal affairs while on class time • Be open and transparent about what we are doing in class • Not distribute course materials to others without authorization	• Be available to all students when we say we will be • Follow through on our promises • Not modify the expectations or standards without communicating with everyone in the course
Courage	• Say or do something when we see actions that undermine any of the above values • Accept a lower or failing grade or other consequences of upholding and protecting the above values	• Say or do something when we see actions that undermine any of the above values • Accept the consequences (e.g., lower teaching evaluations) of upholding and protecting the above values

* This class statement of values is adapted from Tricia Bertram Gallant, Ph.D.

University Policies

Important Dates

Drop Deadline: November 8, 2024 (last day to drop without course on transcript)
Course Withdrawal Deadline: December 3, 2024 (course still appears on transcript with 'W")

Grading Scheme

GRADE	GRADE POINT	PER CENT RANGE	DESCRIPTION
A+	9	90-100	Exceptional
A	8	80-89	Excellent
B+	7	75-79	Very Good
B	6	70-74	Good
C+	5	65-69	Competent
C	4	60-64	Fairly Competent
D+	3	55-59	Passing
D	2	50-54	Marginally Passing
E	1	(marginally below 50%)	Marginally Failing
F	0	(below 50%)	Failing

Academic Honesty and Integrity

Academic misconduct undermines the values of honesty, trust, respect, fairness, and responsibility that we expect in this class. York University provides supports such as academic integrity workshops to ensure that all students understand the norms and standards of academic integrity that we expect you to uphold.

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards. Please review and familiarize yourself with the policy.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve your research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website:

Examples of actions that do not adhere to York's Academic Integrity Policy include:

- Plagiarism (passing off someone else's work as your own)
- Accessing unauthorized sites for assignments or tests
- Unauthorized collaboration on assignment and exams
- Uploading work to third party repository sites (e.g., Course Hero, One Class, etc.)
- Scanning, sharing, uploading, or publishing exams, tests, or scholarly work

For more information on what academic integrity is and why it is important see: https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/. Information on the process of investigations into breaches of academic honesty: https://spark.library.yorku.ca/academic-integrity-breach-of-policy-on-academic-honesty/

Important Note from the FSc Committee on Examinations & Academic Standards (CEAS): Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g., Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. Whenever a student submits work obtained through an external site (e.g., Course Hero, Chegg), the **submitting student will be charged with plagiarism** and the **uploading student will be charged with aiding and abetting**. To avoid this risk, students are urged not to upload their work to these sites.

Assistance for Students (Academic and Well-Being)

Academic Advising*: https://www.yorku.ca/science/academic-advising/ * Departments also offer program-specific advising. Check with your Department's Undergraduate Office.

Centre for Human Rights, Equity, and Inclusion: https://rights.info.yorku.ca

Centre for Indigenous Students Services: https://aboriginal.info.yorku.ca/

Good2Talk 24-hour Ontario Student Helpline: 1-866-925-5454 /Text: GOOD2TALKON to 686868

Keep.meSAFE: https://myssp.app/keepmesafe/ca/home

Learning Commons (general academic learning supports including library research, time management, study skills, career planning, etc.): https://learningcommons.yorku.ca/

Peer Assisted Study Sessions (PASS): https://www.yorku.ca/colleges/bethune/get-help/pass/

Peer Tutoring: https://www.yorku.ca/colleges/bethune/get-help/peer-tutoring/

Sexual Violence Response and Support: https://thecentre.yorku.ca

Student Counselling, Health & Well-being: https://counselling.students.yorku.ca/

Support Services for International Students: https://yorkinternational.yorku.ca/international-student-support/

Writing Services: https://www.yorku.ca/colleges/bethune/get-help/writing/

York University Student Services: https://family.yorku.ca/student-services/#SCD

York University Student Well-being Resources: https://www.yorku.ca/well-being/resources/students/

Accessibility

York University is committed to principles of respect, inclusion, and equality of all persons with accessibility needs across campus. The University provides services for students with accessibility needs (including physical, medical, learning, and psychiatric needs) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with accessibility services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with accessibility services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Student Accessibility Services: https://accessibility.students.yorku.ca

York Accessibility Hub: http://accessibilityhub.info.yorku.ca/

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course Director immediately. To arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an accommodation request form at least 3 weeks before the exam period begins. https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf

Student and Instructor Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University.

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

https://calendars.students.yorku.ca/policies-and-regulations

Course Schedule

Week of	Lecture topic	Lab topic	Assignments due
September 2	Course intro	*No lab*	
September 9	Population growth	Intro to RStudio	
September 16	Population regulation	Population Growth	Intro to RStudio writeup
September 23	Field methods I, Life history strategies	Snail population biology I	
September 30	Life history strategies, cont'd	Snail population biology II	Population growth writeup
October 7	Midterm review	*OPTIONAL data clinic for snail lab*	**Midterm I (Wed)**
October 14	*READING WEEK*		
October 21	Field methods II, hybridization	Trophic interactions & goldenrod galls	Snail population biology writeup
October 28	Predator-prey interactions	*OPTIONAL data clinic for goldenrod lab*	
November 4	Structured populations	Structured populations	Goldenrod writeup
November 11	Midterm review	*No lab*	**Midterm II (Wed)**
November 18	Metapopulations	Metapopulations	Structured populations writeup
November 25	Complex dynamics	*No lab*	Metapopulations writeup
December 2	Conclusions	*No lab*	
Finals period			**Final exam (Date TBD)**

Note: Lecture and lab topics subject to change!