

**DEPARTMENT OF BIOLOGY
UNIVERSITY OF TORONTO MISSISSAUGA**

**BIO205H5F LEC0101
Ecology
Course Outline - Summer 2023**

Class Location & Time	Mon, 09:00 AM - 11:00 AM IB 150 Wed, 09:00 AM - 11:00 AM IB 150
Instructor	David Murray-Stoker
Office Location	DV2014
Office Hours	Tue/Thu 9:00 AM - 12:00 PM, Wed 1:00 PM - 4:00 PM
Telephone	905-569-4484
E-mail Address	d.stoker@mail.utoronto.ca
Course Web Site	https://q.utoronto.ca
Teaching Assistant	TBD
E-mail Address	TBD
Teaching Assistant	TBD
E-mail Address	TBD

Course Description

An introduction to the scientific study of ecology, emphasizing the structure and dynamics of populations, communities and ecosystems. Topics include population growth and regulation, competition, predation, biodiversity, succession, and nutrient cycling. Classic models and studies will be supplemented with both plant and animal examples. [24L, 18P]

Prerequisite: (BIO152H5 and BIO153H5) or (ENV100Y5 for students in Environmental Programs)

Exclusion: BIOB50H3 (SCI)

Distribution Requirement: SCI

The UTM Calendar states that students who lack the prerequisites for a course can be deregistered at any time.

Objectives

Course Goals

This course introduces the science of ecology by examining how individuals interact with each other and their environment. We will study how scientists investigate these interactions across different spatial and temporal scales, and discuss how ecologists display, interpret, and apply quantitative data to conservation issues and environmental management. Through the course practical sessions, we will develop skills required to develop research questions, collect data, and communicate one's work through the creation of a multi-stage lab report. **My ultimate goal is to enable you to think of the world through an ecological lens and how multiple components of a system interact.**

Learning Objectives

At the end of the course, you will be able to:

- Identify and analyze the effects of biotic and abiotic factors on organisms.
- Define the ecological dynamics of species interactions.
- Examine and predict patterns of biodiversity across spatial and temporal scales.
- Engage in the process of science through a course-based research project.
- Collect and interpret data to understand patterns of biodiversity.
- Develop a holistic approach to science through systems thinking.

Required Textbook and Materials

Textbook

Ricklefs, R., R. Relyea, and C. Richter. 2018. Ecology - The Economy of Nature; Canadian Edition. **€ Book or custom loose-leaf edition for UTM)**

All laboratory instructions will be posted as PDFs on Quercus.

Technology

You will need access to a device (e.g., laptop, tablet) with internet access for lecture activities, email correspondence, using the course website, and completing assignments. You are also encouraged to use a laptop or equivalent device with Microsoft Office installed (software subscription included with your university email) or use Google Docs to complete the coursework (described below). Students may also borrow laptops from the UTM library. **If you do not have reliable access to the internet and/or a suitable device, please contact me so we can find a positive solution.**

R Statistical Software

R is a flexible, powerful, open-source program for statistical analysis that runs on all operating systems. R should be downloaded and installed before the first lecture. You can download R by following this link: <https://cran.r-project.org/>. I will provide an instructional video on Quercus to demonstrate the installation process.

RStudio

RStudio is a graphical user interface that helps to write code and analyze data. RStudio also allows for easy writing of R Markdown files, which will be used for data analysis for your lab report and also to illustrate some concepts in lecture. You can download RStudio by following this link: <https://posit.co/download/rstudio-desktop/>. I will provide an instructional video on Quercus to demonstrate the installation process and user interface.

Supplemental Textbook and Materials

Textbook Alternatives

You may use the previous Canadian edition: Ricklefs, Relyea, and Richter. 2015. Ecology - The Economy of Nature; 7th Canadian Edition. **(eBook or custom loose-leaf edition for UTM)**

Using other versions and editions is not recommended, although the 8th edition is very similar in content. Relyea, R., and R. Ricklefs. 2018. Ecology - The Economy of Nature; 8th Edition.

Citation Manager

I highly encourage the use of Zotero for reading papers and formatting citations for your lab report. Zotero is free software for up to 300 MB of storage, which is plenty of space for BIO205. I use Zotero for reading scientific papers and to manage citations when writing my own papers. I will provide an instructional video on Quercus to demonstrate the installation process, and I will also show how Zotero can be used in both Microsoft Word and Google Docs. You can download Zotero from here:

<https://www.zotero.org/>

Assessment and Grading Policies

Type	Description	Due Date	Weight	
Assignment	Weekly reflection on one lecture topic (weeks 1-6)	On-going	15%	
Lab	Worksheets and data collection/analysis	On-going	15%	
Term Test	Take-home term test (lectures 1-5)	2023-05-26	20%	
Assignment	Lab report	2023-06-16	20%	
Final Exam	Cumulative final exam (primarily lectures 6-12)	TBA	30%	
			Total	100%

Notes on Assessment Items

General Notes

You should expect to complete 12-16 hours of study and work each week for this course, including time spent in lectures and practicals. In other words, there will be an average of ~5-9 hours of work outside of lectures and practicals for you to complete the readings and course assignments. The course schedule is at the end of the syllabus, but the table above highlights the assignments and their weight towards your final grade.

Weekly Reflections

You will complete a weekly reflection on one of the lecture topics (~250-500 words, more if desired) for weeks 1-6 (i.e., 6 total reflections). These reflections will have directed prompts to guide your reflection, but there will also be an open field for you to expand on any component of the lecture. I highly encourage you get into the habit of doing these reflections within 24-48 hours of the lecture while everything is still fresh but you have also had time to process the concepts and material.

Practical Activities

Practicals start the first week of class (see schedule below). Practical activities will complement lecture material by allowing you to form your own research question or hypothesis, collect and analyze data, and write a scientific paper. In other words, **you will go through the entire research process during the practicals**, from reading papers for background and developing a research question to data collection and analysis. Assignments will be introduced for each weekly practical session, and group worksheets will be due at the end of your practical session. Practical 1 and 3 will be outside, rain or shine, so make sure to dress appropriately (good shoes, pants, etc.) and stay hydrated!

Lab Report

As an ongoing project in the practicals, you will write a lab report. We will cover the foundational knowledge and supporting information will be provided in the weekly practical activities. Detailed guidelines and instructions will be posted on Quercus, including a generic template for how scientific articles are typically structured and what needs to be included. I encourage originality and creativity, but I also want to make sure core components are included in your lab report.

You will be using R to analyze data and generate figures for your lab report; however, I will be providing you with template code files for analyses and creating figures. Template scripts will be tailored to research questions or hypotheses submitted in week 2 (see schedule below), so you will already be able to see how analyses are conducted and figures created - you will just need to copy and paste the code and make minor edits to complete all analyses and create all the figures.

R is an incredibly useful program for data management, analysis, and figure creation. While using R may seem intimidating (as it was for me when I first started using it), knowing how to use R is a valuable skill that extends beyond just this course and into all aspects of biology, public health, and medicine (to name just a few). **I have every confidence in you to learn and use R, and your TA and I will be there to support you if you are facing any challenges.**

Term Test

The take-home term test will cover specific lectures and be due 72 hours after being released through the course website. The term test will consist of case study evaluations and short answer/essay questions. It will also include directed reflection questions. The term test will be submitted through Quercus. The term test will be open book, but you are encouraged to take notes so you can develop knowledge recall and application in preparation for the final exam and when you apply your learning and understanding of ecology to your everyday life.

Final Exam

The final exam will be cumulative, although it will focus primarily on lectures 6-12. You will synthesize your learning through a concept map (to be clarified in lecture) in addition to case study evaluations and short essay questions. The final exam will also consist of prompted reflection questions. The final exam will be closed book but open notes (12 pages, double-sided, handwritten notes) and it will take place during the in-person examination period.

Evaluation

We will be using the 'ungrading' approach to all evaluations rather than traditional grading systems. Ungrading is a fairly complex approach, but the main point is to make evaluation and assessment more of a conversation between you, your TA, and me. We are able to do this through a combination of self-evaluation, feedback, and reflection.

You will still receive a letter grade at the end of the course, but learning is more complex and personal than just a number or letter: **learning is process**. Below I will expand on the evaluation for each type of coursework and how ungrading will be applied.

Weekly Reflections

Lecture reflections are designed for you to articulate what you learned from one of the weekly lectures and document your learning process. I will provide comments and feedback on each reflection, offering advice, clarification, and encouragement as appropriate. I will also be using these reflections to help identify any misconceptions or difficulties from the lecture, so it is important that reflections also discuss challenging topics. Reflections will be evaluated for completion and addressing the reflection prompts.

Practical Activities

Practical activities will generally be evaluated for completion. We will check for accuracy on the data submission and also for the data analysis assignment, noting any inaccuracies and why this could affect analysis and interpretation.

Lab Report

You will submit a lab report consisting of an introduction, results, and discussion along with tables and figures. Your lab report must address the research question or hypothesis and predictions you proposed earlier in the term. We will not be using traditional rubrics for the lab report, instead using a core checklist of items that should be in each section of the lab report. Outside of that checklist, I want to encourage your creativity and originality.

I will provide a generic template for a lab report on the course website so you can see the general structure and flow for each section (i.e., introduction, results, and discussion). Given the compressed and fast-paced nature of summer courses, this should help you develop a general sense of what a scientific article includes. Additionally, our literature review during practicals will examine not only the content but the structure of a primary research article, which will serve as a 'model' for structuring your lab report.

You will submit your lab report for evaluation by your TA and me by June 16. Your TA and I will independently go through the core checklist and then provide feedback, including positive comments and also constructive criticisms by June 21. We will not provide a numeric grade on the assignment at this time, but I will maintain a spreadsheet of scores from the core checklist. You will then have the opportunity to review the checklist and our feedback, and then you will evaluate your lab report given the feedback you have received. You will then submit your self-evaluation of your lab report by June 25 and I will compare it to my evaluation. I will compare the points I think you earned, the points you think you earned, and the average of your score and my score. If my score is higher than your point total, we will typically use my point total. At this time, I will provide all of my scores for your lab report for transparency.

Term Test & Final Exam

'Graded' term tests will be returned to the class alongside a summarized feedback form. No scores will be written on the term tests, but I will have a spreadsheet of scores that I think each student earned for each test question. Based on your work and the feedback we have provided, you will write the number of points you think you earned for each question on a separate sheet (available points per question will be noted on the test). This separate sheet will be turned in with corrections along with any logical reasoning and arguments over potentially vague or confusing questions. I will then compare the points I think you earned, the points you think you earned, and the average of your score and my score. If my score is higher than your point total, we will typically use my point total.

To control overinflation from students inflating their grade, if your score is within 1 standard of my overall score, you will receive 5 bonus points. If your score is greater than 3 standard deviations of my overall score, I will deduct 10 points. I want to encourage accurate and honest self-assessment, which means fair evaluation of yourself and respecting my evaluation.

We will follow the same process for the final exam as we used for the term tests, and the only difference between the term tests and final exam is that final exam is cumulative (primarily focusing on lectures 6-12).

The term test will be returned to you by May 31 and you must return your self -valuation by June 2 (at 11:59pm). We will follow the same process of self -valuation for the final exam, with exact dates to be announced.

Teaching Methods and Academic Supports

BIO205 is an active learning class where you are part of the learning process. You are expected to come to class ready to engage in the material by participating in lecture and practical activities, collaborating with your peers, and applying the concepts learned to case studies. **Learning can also bring about discomfort, and I will be challenging you in this course. I will challenge you because I know we all have the potential to grow and learn.** Reflection is also central component of the learning process in this course. I want you to think about what you have learned and how you learned it.

Ungrading is central to this course. While ungrading does require work from both you and me, that work has lasting benefits beyond any single lecture or practical. I want to help you learn about and have fun with ecology, but I am also here to help you grow as a learner. **Through the process of ungrading, we will stress less on any grade and focus more on learning.**

Lectures

Lectures will expand on aspects of the assigned textbook readings by going into great depth and applying knowledge to case studies and examples. You are responsible for reading the assigned chapters before class to get the most out of the lectures. All lectures will be recorded and posted to Quercus within 24 hours.

Practicals

Practicals will complement the lectures and will provide you with first-hand experience of the process of science.

Readings

Reading the assigned chapters is essential to get the most out of lectures, and content and concepts from these chapters will be included on the term tests and final exam.

Time Management and Learning Practices

All summer courses are fast paced, including BIO205. If you find you are struggling with time management or keeping up with the material, please come to student (office) hours or we can schedule a private, one-on-one meeting. You may also talk to your academic advisor or the Robert Gillespie Academic Skills Center for guidance and advice on time management and effective learning practices. **I know that every student can succeed in this course, but sometimes the learning environment and support systems just need to be restructured to make that happen.**

Procedures and Rules

E-Mail Policy

The University's official method of correspondence with students is through their University of Toronto e-mail accounts. It is the student's responsibility to keep his/her @mail.utoronto.ca account active and check it on a regular basis.

All e-mails from students must include your full name and student number as well as have the course code in the subject line.

Re-Mark Policy

Requests for re-evaluation of course work must be made in writing to the instructor no later than one month following the return of the work. Re-evaluation may result in a grade increase, decrease, or no change.

Further Notes on the Re-Mark Policy

By using the ungrading approach, we will actively discuss evaluations and should therefore reduce the likelihood of any remark. That being said, we will still follow the official University of Toronto remark policy discussed above.

Further Notes on the E-Mail Policy

To help me and your TA better respond to emails, please include BIO205 in the subject line and then your student number either in the text or signature of your email. I also ask for patience when responding to emails. I will try to respond as quickly as possible, but give me at least 24 hours to respond to any message. I likely will not respond to emails over the weekend, but I will aim to respond to by 5 PM the following Monday.

Attendance and Participation

Attendance is essential for your learning, as is your participation in active learning during lectures and practicals. I will not take attendance during lecture, but attendance will be taken during practicals through submission of group worksheets and individual submissions.

Absences

Declare your absence on ACORN. You will email your TA for missed practicals while missed course work or accommodations/extensions you will email me. Please send the email within 48 of your absence declaration with a brief explanation for the absence. For an absence to be excused, it must meet University-approved and beyond-your-control criteria. Absences beyond University guidelines may be excused on a case-by-case basis.

Religious Observance

Information about the University's Policy on Scheduling of Classes and Examinations and Other Accommodations for Religious Observances is at <http://www.viceprovoststudents.utoronto.ca/publicationsandpolicies/guidelines/religiousobservances.htm>

Classroom Management

You and I are expected to come to lectures and practicals prepared, on time, and with our cell phones and other devices on silent and only to be used for lecture or practical activities. All lectures will be recorded over Zoom and posted on the course website by the next day following the lecture. We will take a ~10-15 minute break halfway through each lecture period for a physical and mental rest.

I expect you to treat yourself and others with respect in our learning community so we can engage, learn, and grow throughout the course. We each bring our own identities and experiences from our everyday lives, and that diversity will be celebrated.

Late Assignments, Extensions and Missed Term Tests

You are expected to complete and submit all assignments on time.

You are expected to complete and submit all assignments on time, although extensions and accommodations can be provided.

The University is temporarily suspending the need for a doctor's note or medical certificate for absences from academic participation (<https://www.viceprovoststudents.utoronto.ca/covid-19/>).

Please use the Absence Declaration tool on ACORN to declare an absence if you require consideration for missed academic work.

Late Policy

All assignments and term tests will have a penalty of 10% for each day the assignment is late up to a maximum of 5 days, after which late submissions will not be accepted. I have this policy to encourage you to stay on top of the material, which is to your benefit and that of your peers.

Extensions

If you require an extension to complete an assignment due to injury, illness, or accessibility, please let me know as soon as possible and preferably at least 24 hours advance of the due date. Extensions beyond accessibility and illness will be granted on a case-by-case basis.

Missed Final Exam

Students who cannot complete their final examination due to illness or other serious causes must file an [online petition](#) **within 72 hours of the missed examination**. Late petitions will **NOT** be considered. Students must also record their absence on ACORN on the day of the missed exam or by the day after at the latest. Upon approval of a deferred exam request, a non-refundable fee of \$70 is required for each examination approved.

Academic Integrity

The code of Behaviour on Academic Matters states that:

The University and its members have a responsibility to ensure that a climate that might encourage, or conditions that might enable, cheating, misrepresentation or unfairness not be tolerated. To this end all must acknowledge that seeking credit or other advantages by fraud or misrepresentation, or seeking to disadvantage others by disruptive behaviour is unacceptable, as is any dishonesty or unfairness in dealing with the work or record of a student.

- University of Toronto Mississauga Academic Calendar

It is your responsibility as a student at the University of Toronto, to familiarize yourself with, and adhere to, both the Code of Student Conduct and the Code of Behaviour on Academic Matters.

This means, first and foremost, that you should read them carefully.

- The [Code of Student Conduct](#) is available from the U of T Mississauga website (Registrar > Academic Calendar > Codes and Policies) or in your print version of the Academic Calendar.
- The [Code of Behaviour](#) on Academic Matters is available from the U of T Mississauga website (Registrar > Academic Calendar > Codes and Policies) or in your print version of the Academic Calendar.
- Another helpful document that you should read is [How Not To Plagiarize](#), by M. Proctor.

Notes on Academic Integrity

We will not be using Ouriginal for plagiarism detection in this course. However, generative AI (e.g., ChatGPT) will not be permitted in any form during this class and its use will be considered a violation of academic integrity. I am looking to see how you grow and learn throughout the course by looking at your work, not that of an algorithm or text-mining program.

Additional Notes

Personal Health Resources

There are many resources available through UTM that can benefit students and I would encourage you to use these resources discussed below to help you make the most of your time at UTM. These include:

The Equity, Diversity, and Inclusion Office: <https://www.utm.utoronto.ca/equity-diversity/>

The Indigenous Centre: <https://www.utm.utoronto.ca/indigenous-centre/welcome-indigenous-centre>

The Health and Counselling Centre: <https://www.utm.utoronto.ca/health/health-counselling-centre>

This also includes the My Student Support Program or MySSP which provides University of Toronto students with immediate and/or ongoing confidential, 24-hour support for any school, health, or general life concern at no cost to students. You can call or chat with a counsellor directly from your phone whenever, wherever you are for a range of concerns. Students who use MySSP still have access to existing campus and community mental health services; MySSP is an additional support service. You can also access the service 24/7 by calling 1-844-451-9700. Outside of North America, call 001-416-380-6578. There is also an App you can use to access this service (<https://myssp.app/ca/home>).

Another number to have saved is Good2Talk (<https://good2talk.ca/>), which is a free, confidential support service for post-secondary students in Ontario. To talk, call 1-866-925-5454. To text, text GOOD2TALKON to 686868.

Other Resources

AccessAbility

The University accommodates students with disabilities who have registered with the AccessAbility Resource Centre. Please let me know in advance, preferable in the first week of class, if you will require any accommodation on these grounds. To schedule a registration appointment with a disability advisor, please call the centre at 905-569-4699 or e-mail at: access.utm@utoronto.ca. <http://www.utm.utoronto.ca/access/>

Robert Gillespie Academic Skills Centre

Students can visit the Academic Skills Centre to consult with one of its strategists about understanding learning style, developing study plans for upcoming tests/exams, or discussing papers. Special Diagnostic Assessments are also offered and are designed to help you learn exactly where you stand with respect to critical academic skills.

<http://www.utm.utoronto.ca/asc>

UTM Library (Hazel McCallion Academic Learning Centre)

The University of Toronto boasts the biggest academic library in Canada and the second biggest in North America. Various services are available to students at the UTM Library and across the UofT library system. Services including borrowing, interlibrary loans, online references, laptop loans and the RBC Learning Commons. For more information, visit <http://library.utm.utoronto.ca>.

Course Schedule

Week	Date	Lecture	Readings
1	M - May 8	L1: Syllabus What Is Ecology?	Chapters 1 and 7
	W - May 10	L2: Adaptations to the Environment	Chapters 2-4
2	M - May 15	L3: What Is A Population?	Chapter 11
	W - May 17	L4: Population Growth and Regulation	Chapter 12
3	M - May 22	No Class (Victoria Day)	
	W - May 24	L5: Populations in Space and Time	Chapter 13
4	M - May 29	L6: Predation and Herbivory	Chapter 14
	W - May 31	L7: Parasitism and Infectious Diseases	Chapter 15
5	M - June 5	L8: Mutualism and Competition	Chapters 16 and 17
	W - June 7	L9: Community Structure	Chapters 18 and 19
6	M - June 12	L10: Biodiversity, Conservation, and Global Change	Chapter 23
	W - June 14	L11: Ecology Across Scales: Transfer of Energy	Chapter 20
7	M - June 19	L12: Ecology Across Scales: Nutrient Cycling	Chapter 21
	Study Break		

Practical Schedule

Week	Practical Topic	Assignment	Weight
1	Introduction to BIO205 Practicals Campus Habitat Tour	Group Worksheet	1.5%
2	Question, Hypothesis, and Prediction Workshop Soil Analysis Lab	Individual Submission Group Worksheet	3% 1%
3	Data Collection	Group Data Submission	3%
4	Literature Review	Group Worksheet	2%
5	Data Analysis	Individual Data Analysis & Figures Submission	2.5%
6	Lab Report Writing Session	NA	NA
7	None	Course, Practical, and TA Surveys	2%

Last Date to drop course from Academic Record and GPA is June 5, 2023.

Every attempt will be made to follow this syllabus, but its contents are subject to change according to the rules as outlined in the UTM Instructor's Handbook, section 3.2.2.