Department of Biology Course Outline

BIOL 4255, Biodiversity
Term W, 2024

Course Description
We do not know the number of species on Earth, even to the nearest order of magnitude. This course discusses the factors that influence the number of species in an area and the importance of biodiversity to humanity.

Prerequisites (strictly enforced)
Completion of 60 credits required, towards a degree in biology or environmental science or environmental studies, or permission of the Instructor

Course Instructor(s) and Contact Information
Instructor: Mateus Pepinelli, email mateus@yorku.ca
TA Tuesday and Thursday: Nora Romero: norarom@yorku.ca
TA Wednesday and Friday: Alejandro Biganzoli: bganzoli@yorku.ca
Additional TA: Jesse Huisken: huisken@yorku.ca

Schedule
Day and Time of Lectures, Tue&Thurs 11:30am (room DB 0006)
Labs Tue&Wed&Thurs&Fri 2:30pm
Office hours: by email appointment for Instructor or TA.

Evaluation
Provisional Marking Scheme

Mid Term	*20%*
Final Exam	*20%*
Lab Module 1 Phylogenetics	*15%*
Lab Module 2 Biodiversity statistics	*15%*
Lab Module 3 Extinction	*10%*
Assignment	*10%*
Quizzes (in lab sessions)	*5%*
Quizzes (in class sessions)	*5%*

I have never found it necessary to adjust final grades through bell-curving or any other means and it is unlikely that this will be the case this year either.

Important Dates

https://calendars.students.yorku.ca/

First lecture Jan 9th. Last lecture April 2nd
Lab session day changes have to be arranged through the relevant TA(s) and be for unavoidable reasons and will require permission before the relevant lab date.
Religious accommodations have to be arranged with the relevant TA(s) well in advance.

Resources

All information required for successful completion of the course will be provided during laboratory and lecture sessions. Additional resources will be cited from within lecture and laboratory materials but it should *not be necessary* to consult these unless you wish to delve into the subject in greater detail than the course evaluations will require.
Lab handouts and computer programs relevant to each of the three modules and two assignments will be provided one week before the relevant lab sessions.
There is NO TEXTBOOK – for the simple reason that there is no text available that deals with more than ~1/3 of the lecture materials and none of them are up-to-date enough for ~2/3 of the lecture materials.

Learning Outcomes

Upon successful completion of this course, students should be able to:
Cognitive: understand the principles of classification and the difficulties associated with the term "species" and estimating how many species there are on earth. Students will be able to explain DNA barcoding – how it works and what the results show, how species are described, how to assess species richness from the fossil record, mass extinctions – patterns and processes, evidence for and causes of the Pleistocene megafaunal extinctions, historical extinctions and their causes, the special case of islands, how extinction actually happens, conservation genetics, predicting future extinction rates, the impact of deforestation and climate change, practical uses of biodiversity, biodiversity statistics, how to construct a phylogeny, perform biodiversity statistical analyses, perform computer simulations using vortex, prepare a debate without knowing which side you will be on.
Psychomotor: use of a computer, perform rhetorical gestures, adopt parliamentary postures.
Affective: obtain an appreciation of the beauty and academic interest of biodiversity, to obtain a deep caring for life on our planet, to be able to cope with the deep depression that current political/environmental policies may cause through mass extinction and the resulting predicted social unrest.

Course Content

Lectures:
Definitions of biodiversity
The inadequacy of the Linnean hierarchy
Principles of classification based upon phylogenetic reconstruction
Cladistic terminology, principles, phylogeny, and analysis
Species concept
DNA barcoding and integrative taxonomy
Taxonomy in practice, rules of nomenclature
How many species are there?
Biodiversity from the fossil record
Mass extinctions
Pleistocene megafaunal extinctions
Historical extinctions
Endangered species
Processes of extinction
Genetics of extinction, conservation genetics
Predicting future extinctions: habitat loss, climate change
Geographic patterns in species richness
Uses of biodiversity: ecosystem services
Biodiversity statistics

Lab, Sessions:
Module 1. Practical application of the principles of classification based on heuristics, formal cladistic analysis using morphological characters and molecular data.
Module 2. Calculation of a wide range of biodiversity statistics.
Module 3. Vortex simulations of extinction processes.
Assignment. Gather data of biodiversity and conservation relevance of a particular group of organisms.
Debate. How to understand both sides of a current topic of importance in the study of biodiversity.

Experiential Education and E-Learning

All content is delivered in person.
The affective components of the course are, by definition, experiential education.
See the tentative lecture schedule for details. This lecture schedule will be updated as the course progresses.

Other Information

Lectures are delivered in person. Labs will be delivered in person.

The understanding that should result from these three lab modules will be returned to frequently elsewhere in the course AND module 1 of the labs relies upon your understanding this subject matter. Thus, while exams are not cumulative – other than in cases where a student misses the first midterm - retention of the understanding resulting from these lectures will be important. Students who have already taken Entomology 4230 will find this part of the course easier, but we will be looking at the topic in greater depth so you should still attend.

As detailed information will be provided in the ppt slides associated with lectures.

We will use iclicker during some lectures for greater participation and discussion.

Labs should work with mac computers, though as the programs we use were developed with pcs in mind, macs may be less fast at times. **[It is STRONGLY recommended that you find a pc computer to use for the labs]**

To succeed in this course, pay attention, make notes, revise the notes and recordings of lectures before exams. Take additional notes if you look through past lectures a second time. For labs, turn up on time (there will be a graded quiz at the beginning of each session that will contribute to your lab mark), turn up having read the lab handout carefully (the quiz questions will be based upon it), questions asked during lab sessions that demonstrate that you have not read the lab handout carefully will result in penalties.

Course Policies

Email: Please put BIOL 4255 in the subject line. Please include your name and student number at the end of every email. Please allow 2 working days for an answer.

A missed first midterm exam will result in the subject matter covered in that exam being added to the second midterm for individual students. A missed second midterm or final exam will result in a make-up exam at a date decided upon by the instructor in collaboration with the students missing the exam.

Late assignments (lab write-ups, assignments) will receive a penalty of 15% per day for a maximum of three days after which they will no longer be accepted.

In either of the above, advanced warning of the issue should be provided to the instructor or relevant TA.

Assignments and assessments: This course has been designed to be flexible as follows.

Quizzes
There are lab and lecture quizzes in this course. These will be written in person during lab time or using iClicker during class time. There is no make up for quizzes. All quizzes are designed with universal accommodation thus they are already created in a way that accommodates students who require extra time. If you have a different accommodation this will be discussed individually.

Written Submissions
There are 4 written submissions (1 assignment and 3 lab reports) for this class that you will do at home. These are assigned and complete on your own time using crowdmark. Failure to submit an assignment will result in a zero grade. The use of AI resources is expressly forbidden unless it forms part of the assessment.

Penalty for late submission of assignments:
10% per calendar day is deducted for late assignments. Late penalties apply immediately following the deadline (e.g. if the assignment is due at 5pm, it is late any time after 5pm and a penalty will apply). Submission of assignments must be via both the crowdmark and eCLASS.

Participation
This course includes a variety of participation components including the use of clickers in class. Your participation is recorded. You need to respond to 75% of questions provided in any one class (this will accommodate for device failure) and 75% of the classes that use clickers to receive full marks. This means you can miss 25% of the participation events without penalty. Answers to these are not marked, this is participation only. Other activities may also be given as the course progresses.

Missed Final Exam:
All students who miss the final examination must submit a deferred standing request via a Deferred Standing Agreement Form (DSA) within one week of the exam. The format of the make-up final exam for this course is at the instructor's discretion.

Requests for extra credit or extra assignments:
There are NO extra assignments for extra credit or to boost marks and your final mark is not negotiable. The marking scheme for the class already contains considerable flexibility. Requests for this will not receive a response.

We will endeavour to return marks two weeks following submission. Emails requesting updates on marks or faster marking will not receive a response.

This class is IN PERSON and it is expected that you will attend class and arrange to catch up on anything you miss independently.

While I try to respond to email within 2 working days (not including weekends), this is not always possible. If your questions (and my answer) would be of interest to the entire class I may request that you post it on the appropriate discussion board or use a course announcement. It is your responsibility to ensure you're receiving and reading eClass course announcements!

Please do not use eClass Messenger for contact as it is not used for this course.

University Policies

Academic Honesty and Integrity

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.
There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - http://www.yorku.ca/academicintegrity/

Important A note from the Faculty of Science Committee on Examinations and Academic Standards: 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. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning, sharing, uploading or publishing these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.
Student's in need of these services are asked to register with disability 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 disabilities 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. Please note that 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
https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf
at least 3 weeks before the exam period begins.

Student 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/