

UNIT 1: Introduction

1 Course overview

1.1 Course structure

Communication

- Lecture notes for each section will be available the afternoon before you need them
 - Check AtL frequently for announcements and new information
 - All info will also be on the course resource page
 - * <http://bio3ss.github.io/>
- The professor is Jonathan Dushoff
 - `dushoff@mcmaster.ca`
 - Office hours will be announced
 - Or ask questions electronically
 - * We need a forum!

Expectations of professor

- Start and end on time
- Focus on conceptual understanding
- Make clear what terminology and facts must be learned
- Open to questions – both in class (within reason) and at office hours
- Responsive to questions on class forums (to be decided)

Expectations of students

- Start and end on time
- Don't talk while other students are talking, or while I am responding to student questions
- If you must talk at other times, be unobtrusive
- Don't use the internet for non-class activities
- Attend the lecture, and the mandatory tutorials

Texts

- The primary text for this course is the lecture notes
- You will be given readings, which will be posted to AtL
- You are required to have an Ecology textbook
 - Molles and Cahill, Second Canadian edition is recommended
 - If you would like to use a different textbook, let your TA know, so we can attempt to provide readings.

Structure of presentation

- Required material will be clearly outlined in the notes
 - **Answer:** This is an answer: it was omitted from the notes for discussion purposes, you should probably write it in
 - **Comment:** This is a comment: I omitted from the notes because I thought it wasn't necessary for you to study. If you write it in, make a note to yourself that it's a comment.
- Required terminology will be presented in **bold**
- General ideas and approaches presented in class may also be required; you should take notes on these in your own words

Taking notes

- You will do best if you take notes
 - You should know by now what works for you
 - Or else that you need to keep working on it
- If a new concept is making sense to you right now, write something that will help you remember
- If there's something specific I think you all need to write down, I will write it for you (or mark it as an answer)

Polling

- You can obtain extra credit by responding to in-class polls
 - Text from your cell phone, or answer on the web
- Poll: Why are you taking this class?

1.2 People

Dushoff

- Loves math
- Lived in four countries
- Studies evolution and spread of infectious diseases
 - HIV, rabies, ebola, influenza, ...
 - <http://lalashan.mcmaster.ca/theobio/DushoffLab/>
 - https://twitter.com/jd_mathbio

TAs

- Morgan Kain
 - Ecology and evolution of infectious diseases
- Michael Li
 - Disease forecasting and control
- Steve Cygu
 - Machine learning and health

Students

- Poll: What year are you in?
- Poll: What kind of career are you aiming for?

2 Course content

2.1 Learning goals

- Ecology and population ecology
- Quantitative thinking
- Dynamical modeling

Ecology

- Poll: What is ecology?
- My answer
 - **Answer:** The study of how organisms interact with each other and with the environment
 - **Answer:** Ecology is not environmentalism

Population ecology

- Poll: What is population ecology?
- My answer
 - **Answer:** The study of how organisms interact with each other and with the environment at the population scale
 - **Answer:** Larger spatial scale, longer temporal scale
 - **Answer:** We use *dynamical models* to link from the individual level to the population level

Dynamical modeling

- Investigates the links between local, short-term processes, and large-scale, long-term outcomes
- Allows us to explore what assumptions we're making, and how assumptions affect the link

Math

- Population ecology uses math
 - Math is a critical tool for linking processes to outcomes
 - Math will play a central role in the course
- We will keep it *simple*
 - But we understand that simple does not always mean easy
- Review the math supplement

Humans and abstract thought

- People are evolved to be concrete thinkers, not conceptual thinkers
- A goal of this course is to build conceptual thinking skills