Bio 3SS Introductory material

1   Course structure

Course overview

- Lecture notes for each section will be available on AtL the afternoon before you need them

  – Check AtL frequently for announcements and new information

- The professor is Jonathan Dushoff

  – Office hours Tue 9:30-10:20 AM, Wed 2:30-3:20 PM, or *by appointment,* LSB 332

  – `dushoff@mcmaster.ca`

- The lecture TA is Caroline Cauret

  – Contact through the Facebook group, or AtL

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 (Facebook and AtL)

Expectations of students

- 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

- Give the professor his 50 min

- Lectures are required

- Tutorials are required, unless otherwise specified

  - If you don't go to tutorials, don't bother us about anything covered in 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

Structure of presentation

- Required material will be clearly outlined in the notes

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- 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

Polling

- You can obtain extra credit by responding to in-class polls

  - Text from your cell phone, or answer on the web

- Why are you taking this class?

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`

Students

- What year are you in?

- What kind of career are you aiming for?

3 Course content

3.1 Learning goals

- Ecology and population ecology

- Quantitative thinking

- Dynamical modeling

- What is ecology?

- My answer

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- What is population ecology?

- My answer

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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

3.2 Examples

Malaria

- A nasty, mosquito-borne disease

- In some places (e.g., the southeastern US), it has been eradicated almost by accident

    - Mosquitoes are still present

- In other places it persists at high levels despite concerted efforts at elimination

- *What factors determine when and where malaria spreads?*

Red squirrels

- Red squirrels are rapidly disappearing from England

    - Loss of suitable habitat?
    - Competition from gray squirrels introduced from North America?
    - Diseases carried by gray squirrels?

- http://en.wikipedia.org/wiki/Eastern_grey_squirrels_in_Europe

Cod fisheries

- Is the ocean too big for people to affect?

- What happened to the cod?

- http://en.wikipedia.org/wiki/Collapse_of_the_Atlantic_northwest_cod_fishery

Populations

- What population of organisms interests you?

Dandelions

- Start with one dandelion; it produces 100 seeds, of which only 4% survive to reproduce the next year.

    - How many dandelions after 3 years?
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        - *