

# ESM 211: Applied Population Ecology

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Class Hours: MW 8:00–9:15 AM; F 12:30–2:20 PM

Class Room: Bren 1424; GIS Lab

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Office Hours: Wednesdays, 2–3 PM

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## Course Description

Population ecology is the science that helps us understand why abundances and densities of a particular species vary in space and time. In the face of environmental change, a species of conservation concern might start declining in abundance, or an unwanted species might start increasing. In this course you will learn to use the tools of population ecology to

1. Detect population trends
2. Diagnose the causes of population trends
3. Project future population trends and states, including extinction
4. Establish effective conservation objectives
5. Identify promising management actions to reverse undesirable trends

We will primarily focus on conservation applications, but will also consider examples from invasive species management and harvested species management.

## Readings

There is no textbook for this course; I will post both required readings and reference material to the GauchoSpace page.

There are two texts that you may find useful. We will read a couple of chapters from them (I will provide copies of those), and will provide optional readings to others. There are (or should be) copies of both books in the Bren Library.

Mills, L. S. (2012). *Conservation of Wildlife Populations: Demography, Genetics, and Management*. 2nd ed. Wiley-Blackwell, p. 342.

Morris, W. F. and D. F. Doak (2002). *Quantitative conservation biology: Theory and practice of population viability analysis*. Sunderland, MA: Sinauer Associates.

## Grading

- 70% of your grade will be determined by homework assignments.
- 30% of your grade will be determined by your attendance and participation in classes and labs. Chronic absences or failure to do the class preparation will cost you here.

## Computing in R

If you are a Bren MESM student you are very familiar with this! If you are another sort of student, and don't have much R experience, please read some online tutorials (there are many).

If you plan to use your personal computer rather than (or in addition to) the Bren lab computers:

- If you use Rstudio, I recommend downloading the most recent version. Version 1.0 (released in Fall 2016) has lots of new useful features.
- I recommend updating your version of R to the version that is on the Bren lab computers. Also update your packages (in Rstudio, use **Tools** → **Check for Package Updates...**).

You will be using a variety of packages to do the exercises, so make sure you know what to do when you get a message that says

```
Error in library(foo) : there is no package called 'foo'.
```

In addition, I have a couple of packages on Github that have some useful functions and visualizations that we will use from time to time. To install these, do the following:

1. Make sure that you have the devtools package installed, and if not, install it.
2. Paste the following lines into your console:

```
devtools::install_github("BruceKendall/PVA")
devtools::install_github("BruceKendall/mpmtools")
```

3. Use `library(PVA)` or `library(mpmtools)` to load the package

I may update the packages from time to time, in which case I'll warn you to download and install the new version.

## Preparing for class

1. Visit the Gauchospace page in advance of class for special instructions, readings, etc.
2. **Do the readings** For most classes I will post reading assignments on Gauchospace. Please read these before class, as we will often spend some time discussing them. I know this is a busy time for Group Project, so I will keep these short and/or light. *I highly recommend the first part of [svmiller.com/blog/2014/09/taking-good-notes/](http://svmiller.com/blog/2014/09/taking-good-notes/) for useful advice on effective reading.*
3. **Do computational pre-activities** For some labs I will post detailed instructions in advance. So that we may spend the lab involved in more substantive issues around interpretation, please spend some time running through the mechanics (downloading data, executing commands, etc.), and email me with any places where you are having difficulty getting things to run. Also make note of the parts of the planned lab where you find either the concepts or the computation unclear—this will be a good topic of discussion in class.

4. Check for updates of the PVA and mpmttools packages using the `install_github` command above (I will usually send an announcement of changes, but might forget sometimes)

I will make every effort to get material for a given week posted by Friday of the preceding week. If I'm late, I'll send an email when the material is up.

## During class

Class will be a mixture of discussion, lecture, and computer demonstrations. I generally won't provide lecture notes in advance, but for more technical sessions I will post my notes after class. If you need advice on notetaking see the later part of [svmiller.com/blog/2014/09/taking-good-notes/](http://svmiller.com/blog/2014/09/taking-good-notes/)

For labs, please get your computers ready (logging in, making sure you have the required files from GauchoSpace, starting Rstudio, etc.).

If you're ready to start on time I'll let you go on time.

## Attendance

*Showing up is 80 percent of life* – Woody Allen, [via Marshall Brickman](#)

Of course, ESM 211 is not life, and you will face other constraints (e.g., illness) and opportunities (e.g., an interview for your dream job) that will take you away from class. But I don't work from a textbook, and there is a fair amount of interactive work that will happen in class, so "making up" a missed class is not something easily done.

If you miss class, please:

- Send me an email (in advance, if possible). Don't tell me in person, as I will forget!
- Look to the GauchoSpace page for any relevant printed material, and talk to your classmates to find out what happened in class.

## Office hours

I encourage you to talk to us outside of class about any questions you may have on material from class, or to dig deeper into some topics. Feel free to drop in to our scheduled office hours without an appointment. If you need to meet at a different time, send us an email proposing some times, or catch us after class.