

Conservation Biology
YID3201
Fall Semester 2016
Tuesday & Thursday 4:30 – 6 pm

Instructor: Jennifer A Sheridan
Saga College, RC1-01-04C
jasheridan@yale-nus.edu.sg
Office Hours: Monday 1-2:30, Tuesday 3-4:30, and by appointment

Course Description

This course is designed to give you an introduction to the principles of conservation biology, and to familiarize you with some basic skills used in the world of conservation. Conservation Biology is the study of earth's biodiversity, its major threats, and means of mitigating those threats. General topics we will cover include factors driving trends in biodiversity, understanding threats to biodiversity, and the role of ecology and behavior studies in conservation. Additionally, we will cover wildlife survey and analysis skills that are commonly used in conservation. We will use one of the standard texts for this topic (Principles of Conservation Biology by Groom *et al.*), along with very recently published readings from the primary literature (chosen by the professor during the semester to assure that these are the latest available on a given topic), to help you understand the basic principles from the text in a current conservation context. Some example readings are listed below.

The final for this class is a research report in the form of a scientific journal article, on a conservation topic of your choosing. The assignments throughout the semester (see below) are specifically designed to build to this final assignment, by walking you through the major components of such an endeavor (study design, data collection & analysis, and scientific writing). Regardless of your eventual field in Environmental Studies or Life Sciences, these individual skills, and the larger skill of scientific writing, will be valuable to your pursuits. Additionally, this course will provide you with new challenges and allow you to acquire new skills regardless of your year in the College.

Prerequisites:

None. This class is designed to be accessible to anyone who has taken the Common Curriculum science class(es), while being academically rigorous for students in all years in the College.

Learning Goals

By the end of the semester you should

- have a broad understanding of the major threats to biodiversity and be able to cite current examples from the literature on each.

- understand experimental study design, collect valid data, understand the limits of your own data, utilize basic statistics to analyze your data, and write up the results in a concise manner.

- have a basic understanding of various wildlife survey techniques, understand what sorts of questions each technique can be used to answer, and how to properly interpret the results of each.

be able to critically evaluate the strengths and weaknesses of studies in primary literature.

Broader Contribution to ES and LS Majors

This class focuses on threats to biodiversity, and how to mitigate those threats. If you are an ES major, you have likely spent some time learning about policy related to such threats, but it's important to understand the biology behind such threats, as well as how to accurately identify valid vs irrelevant studies pertaining to a given conservation issue. Thus, this class will allow you to better evaluate conservation policy options.

Additionally, understanding patterns of diversity as we will do in the context of examining threats to that diversity, is essential to all life science majors. Further, life science majors need to be able to critically evaluate seemingly conflicting evidence regarding trends in population size and community diversity. This class will also improve your skills in data collection, analysis, and scientific writing, essential to the LS major.

Grading

Your grade will be a mix of your participation in class discussion & in labs, quizzes, lab assignments, and a final project. Note that you cannot receive credit for class participation if you are absent, no excuses. Part of the purpose of the class participation element is for me to gauge how well you can communicate to myself and your peers the scientific topics we are covering

Participation in class & lab discussions/activities: 100 pts

In-class quizzes: 40 pts

Assignments: 110 pts

Final Project: 150 pts

TOTAL: 400 pts

You will be assigned letter grades according to the following percentages. In this class, the A range denotes exceptional work; B is above average; C is average; D is below average; and F denotes failure to learn the basic concepts of the course.

		94-100	A	90-93	A-
87-89	B+	83-86	B	80-82	B-
77-79	C+	73-76	C	70-72	C-
67-69	D+	63-66	D	60-62	D-
		0-59	F		

Note: on your quizzes and exams, spelling & grammar count. One of the goals of college is to teach you to communicate clearly—and this includes proper grammar as well as spelling. I expect you to form complete sentences, to be able to articulate your thoughts clearly and succinctly, and to spell correctly. Points will be taken off if you do not do these things.

Assignments

These experiments are designed to build to your final project, so doing well on them, and learning from them, will help you successfully complete your final.

Assignment 1: Study or experimental design (20 pts)

For this exercise, you will be given a set of questions to choose from (or you can come up with your own) and you will design a study or experiment to answer that question. To do this, you will need to reference primary literature on the topic to see what methods are appropriate, what possible outcomes your study might have, and how your results might be interpreted.

Assignment 2: Data collection (20 pts—10 pts at mid-sem, and 10 pts at end)

In class, we will learn several different ways of collecting data relevant to conservation. Throughout the semester you will be collecting data in various ways, with an intense bout of data collection happening during our fall break trip (see me to make sure you're collecting sufficient data if you cannot join the fall break trip). You are expected to keep detailed notes, and to organize your spreadsheets clearly. We will chat more in class about this, but I will grade your data collection half-way through the semester, as well as at the end, with more details to follow on what exactly you should turn in to me.

Assignment 3: Data analysis (35 pts)

During the semester and on our fall break trip, we will have several exercises that involve data analyses. Each one will have clear goals, and you will be graded on how well you meet those, and on how well you understand the methods we are using. DO NOT hesitate to ask questions if there's something you don't understand! Clarify issues early so you can continue to improve your understanding throughout the semester.

Assignment 4: Scientific writing (35 pts)

You can choose from two options: writing a research paper, or a review paper. The former will be a mini-version of your final, and should be viewed as an opportunity to get feedback on your final. The latter would be an excellent opportunity to familiarize yourself with the literature relevant to your question, and could largely form the meat of your final's introduction and discussion. This will be no more than 5 pages in total (12 pt font, double-spaced), so it is short and designed to allow me to give you feedback on your writing before you turn in the final.

Final:

This will be in the form of a scientific paper, with the goal of submitting it for publication in the Raffles Bulletin of Zoology, the publication of the Lee Kong Chian Natural History Museum. As such, you should familiarize yourself with the articles in the journal throughout the semester, and you will be required to format your paper according to the instructions for authors (<http://lkcnhm.nus.edu.sg/nus/index.php/instructions>).

By mid-semester, you will need to have chosen your research project, which can be based in Singapore (collecting your own data), based on publicly accessible data (discuss this with me during office hours), or based on data you collect over the fall break.

A detailed grading rubric will be handed out during the semester.

Required text:

Principles of Conservation Biology, 3rd Edition. Groom et al., eds.

Copyright Year: 2006; ISBN: 978-0-87893-597-0

NOTE: The bookstore will not carry this book, but this can be easily ordered from Amazon (or other sources) and delivered to Singapore.

Academic Integrity

All of your work has to be your own and all sources and paraphrasing have to be noted and cited appropriately. This can be tricky to navigate early on in your college career, so if you have doubts or questions, please email me or come see me.

By a vote of the Faculty at Yale-NUS College, professors must refer any suspected instances of academic dishonesty to the Academic Integrity Committee for assessment and adjudication:

“Yale-NUS College expects its students to abide by the highest standards of academic integrity as a matter of personal honesty and communal responsibility. Acting with academic integrity requires that (a) students do their own work, (b) students not interfere with the work of others, (c) students accurately and honestly represent the content of their work, and (d) students properly attribute others’ work. Violations of the College’s academic integrity standards undermine both the community and the individual growth of students. Accordingly, they will be addressed with the utmost seriousness and sanctions ranging from grade penalties to expulsion. Examples of violations of academic integrity include plagiarism, copying or sharing homework answers, submitting work completed for one course as ‘new’ work for another course, or fabricating or falsifying research data. Professors are obligated to refer suspected lapses in academic integrity to the Academic Integrity Committee, which follows a set of policies and procedures approved by the faculty when investigating and adjudicating cases.” Source: Yale NUS College Library, “Yale-NUS Policies on Academic Integrity.” (2014). In *Avoiding Plagiarism*. Retrieved from <http://library.yale-nus.edu.sg/plagiarism/>

General Course Policies

Print-outs of lecture slides will be provided to you so that you can take notes—no personal electronic devices will be allowed in class.

Only medical absences will be excused (no make-up assignments will be given to non-medical absences)

Attendance to class is mandatory. This class relies heavily on discussion of each week’s topics, and your absence not only detracts from your own learning, but from the learning of others. Absences will result in reduced grade for participation.

Expected workload

As with all 5MC courses, this class is designed to take 12 hours of time each week, including class time. You are expected to regularly review your notes from lectures and review readings, so that you can call on past topics to inform any given day’s discussion. You should also come to class with at least a couple of questions, either about things you don’t understand, or how a given topic relates

to other things we've covered, or how a conservation issue you've heard about might relate to our topics. You should also be constantly preparing for the final, in terms of reading primary literature related to your research project.

Some weeks we will have surveys in the evenings or on weekends—these are mandatory and listed below, and you should plan for them from the start.

Detailed syllabus

WEEK 1

9 August

National Day—no class

11 August

Introduction to class & Chapter 1

WEEK 2

16 August

Chapter 2: Biodiversity patterns & processes

Quiz 1

18 Aug

Experiment & study design

Reading: Conservation Study design (see Canvas)

WEEK 3

23 Aug

Chapter 3: Threats to biodiversity

25 Aug

Exercise: Biodiversity Conservation and ICDPs (see Canvas)

Reading: ICDP + Recent paper on threats to biodiversity in SE Asia

Evening field exercise: measuring frog abundance & diversity

Assignment 1 Due

WEEK 4

30 August

Chapter 4: Conservation Values & Ethics

Quiz 2

1 Sep

Field trip: camera trapping to measure mammal abundance & diversity

Reading: Wearn et al. 2016. Grain-dependent responses of mammalian diversity to land-use and the implications for conservation. Ecological Applications.

WEEK 5

6 Sep

Chapters 6 & 7: Habitat degradation & loss and Habitat fragmentation

8 Sep

Field exercise: Using drones to measure NDVI to assess primary productivity

Reading: NDVI & primary productivity in tropical forest fragments

WEEK 6

Everyone will be required to meet with me during office hours this week to discuss the topic of your final research paper

13 Sep

Chapter 10: Biological impacts of climate change

15 Sep

Computer lab: analyzing data from drones to measure canopy closure & NDVI

(FALL BREAK: Field trip to Danum Valley!)

Assignment 3 due this week

WEEK 7 (Sheridan gone for Week 7)

27 Sep & 29 Sep

You will need to read Chapters 8 & 9: Overexploitation & Species Invasions on your own, and work on your individual research projects (collect data, analyze data, read through relevant primary literature, etc.). After the intensity of the fall break trip, you will need this time to process everything you've just learned!

WEEK 8

4 Oct

Discussion of current literature on biological impacts of climate change

Readings: TBA

6 Oct

Discussion of research projects to date: discoveries, challenges, remaining tasks

Reading: share your favorite paper you've come across for your research project. Summarize & discuss strengths & weaknesses (email these to me by 3 October)

Quiz 3

WEEK 9

11 Oct

Chapter 11: Conservation genetics

13 Oct

Watch the following videos (before class) and answer questions (see Canvas page) for in-class discussion:

<https://voicethread.com/myvoice/#thread/4427923/22554304/24528116>

https://www.youtube.com/watch?v=WhFKPaRnTdQ&ab_channel=CrashCourse

WEEK 10

18 Oct

Chapter 12: Species & Landscape approaches to conservation

20 Oct

Field exercise: measuring bird abundance & diversity

WEEK 11

25 Oct

Chapter 13: Ecosystem approaches to conservation

Quiz 4

27 Oct

Discussion of primary literature on ecosystem approaches to conservation

Reading: TBA

WEEK 12

1 Nov

Chapter 14: Protected areas

3 Nov

Lab exercise: species identification of camera trap data, managing large data sets

Reading: Primary literature on protected areas of SE Asia

Assignment 4 Due

WEEK 13

8 Nov

Chapter 17: Integration of Conservation Science & Policy

10 Nov

Conservation controversy: debate/discussion on conservation science & policy

FINALS WEEK

Papers due to me by email by 5 pm, Tuesday 22 November

Note: I will be off campus for research starting on 12 November, but will be available by email during reading week and the time leading up to your final assignment. If necessary, I will also be available to skype.

Overview of due dates (including in-class quizzes):

16 August: Quiz

25 August: Assignment 1 due

30 August: Quiz

17-23 September: Fall Break trip to Borneo; Assignment 2, part 1 due;

Assignment 3 due

6 October: Quiz

25 October: Quiz

3 November: Assignment 4 due

10 November: Assignment 2, part 2 due

22 November: Final due