COURSE SYLLABUS
ZOO/BOT/ENR 4420 Conservation Biology
Fall 2017

Instructor Information:

Instructor(s): Jacob R. Goheen (Jake)

Website: goheenresearchgroup[dot]com/index.php/courses/html

Phone: NA

E-mail(s): jgoheen@uwyo.edu

Office: Berry Center 146

Office Hours: TTh 830-930 or by appointment

Course Information:
Lecture TTh 935-1050am BC 217

Prerequisites: LIFE 3400 and one of the following: ENR 3500, STAT 2050, or STAT 2070

Course Description: This course provides an overview of contemporary issues and methods in conservation biology. In particular, we will focus on conservation issues in the Intermountain West.

Disability Statement:
"If you have a physical, learning, sensory or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability to University Disability Support Services (UDSS) in SEO, room 330 Knight Hall."

Objectives/Outcomes/Standards:

1) Gain knowledge and further appreciation for contemporary issues in conservation biology through class lectures, class tutorials, and readings.
2) Use case studies to appreciate both the science underlying conservation policy and management recommendations, and the commitments and compromises inherent to implementation.
3) Hone critical thinking skills through analysis of material presented in class and primary literature.
4) Gain experience articulating conservation issues and decisions to a diverse array of stakeholders.
5) Gain experience with programs Distance, Estimate S, Matlab, and Presence.
6) Acquire ability to interpret and manipulate ecological datasets and graphs.

Grading Standards: 2 exams (100pts each), final (150pts), presentation (90pts), 3 sets of peer evaluations (20pts each), participation (30pts). 530pts total. Make-up work and tests will be considered in the event of a personal emergency. A = 90-100%; B = 80-90%; C = 70-80%; D = 60-70%; F = 0-59%.

A note about calculating your grade: I will show you your grade at two points during the semester. The first time will be after Lecture Test 2. The second time will sometime during the last two weeks of class. If you need to know your grade at any other time, I will be counting on you to calculate it yourself. Please understand that I will be unable to calculate grades at any other times than these, although you are free to email me what you think your grade is for me to confirm.

A note about homework assignments: homework is for extra credit (10pts each). I will grade homework rigorously.

Another note about homework assignments: I cannot "grade" homework assignments twice. In other words, I cannot answer the question "is this correct?" for draft assignments in advance of due dates. However, please note that there are review/help sessions for homeworks before homeworks are due. Please save questions about homeworks until then, or come to my office hours—I am not able to answer questions about homeworks through email.

Attendance/Participation Policy:
University sponsored absences are cleared through the Office of Student Life.

Academic Honesty:
UW Regulation 6-802. The University of Wyoming is built upon a strong foundation of integrity, respect and trust. All members of the university community have a responsibility to be honest and the right to expect honesty from others. Any form of academic dishonesty is unacceptable to our community and will not be tolerated [from the UW General Bulletin]. Teachers and students should report suspected violations of standards of academic honesty to the instructor, department head, or dean. Other University regulations can be found at: http://www.uwyo.edu/generalcounsel/info.asp?p=3051)

Important Note 1
Email Policy: Communication is important. Please treat email correspondence as though it matters (because it does!) by initiating email with a greeting and signing off with your name. I will try my best to respond to email queries within 48 hours, provided questions are clear and concise. If your question will take more than 2-3 minutes to answer, it's best to come to my office hours or schedule an appointment outside of office hours; I'd be happy to answer your question then.

If questions are written with improper spelling, grammar, or syntax, I reserve the right to ignore them.

Important Note 2
Participation: In each lecture, several questions will be posed to the class. Sometimes, I'll be looking for spontaneous answers; other times, I'll ask you to break into groups with 5 minutes or so to ruminate on these. These questions will extend some aspect of the lecture material in attempt to spur communication and critical thinking, while helping you to become more comfortable with impromptu delivery of scientific material. I am looking for evidence of engagement, problem-solving, and critical thought; I am less concerned that your answer is "correct".

Important Note 3
Throughout the semester, you will be asked to print and bring to class materials posted on the website. To the extent that it is possible, please make double-sided copies and please recycle materials at the end of the semester. Thank you.

Tips for Success in Conservation Biology

1) *Be in class, and be punctual.* I will not take attendance, but I suspect that final grades and attendance (in both lecture and lab) will be strongly correlated.

2) *Participate in both lecture and lab.* I assume that you will have read assigned pages prior to lecture. Also, ask questions! Honest inquiry facilitates understanding, and it is a precursor for doing science. Also, if something is unclear to you, odds are it is to a classmate as well. When a classmate raises his/her hand, listen both to the question and the answer.

3) *Keep current.* This is general advice for any course, but it is especially true for courses in which memorization is a key component. Students will vary widely in the ease with which they are able to learn the material.

4) *Learn how you learn.* Students can re-write notes, drill flashcards, draw graphs, make charts, discuss material with classmates, or some combination of these and other study methods. Figure out which tactics work best for you. Again, this is good advice for most courses, but particularly those that combine critical thinking, conceptualization, and memorization (like this one!).

5) *Study with others AND by yourself.* Group work is a good thing, because others can clarify issues with which you're struggling. Working by yourself is also a good thing, because it allows you to focus in depth on what you need to learn (rather than just whatever your group happens to be discussing). Aim for a combination of both of these.

6) *Review notes and ppt pdfs quickly (within 48hrs of class) and ask for clarification when needed.* Unfortunately I am not a jedi, which means it is hard for me to intuit when the material is being covered too quickly or otherwise unclearly. It is my responsibility to ensure you understand the material; this requires you letting me know when you don't understand something.

7) *Understand the difference between questions on content and questions on procedure.* Learn to rely on your classmates for the latter, and ask your professor as a last resort.

8) *Be courteous of others.* Turn off all cell phones prior to class.

9) *Situational awareness is key in class, and life in general.*

Week	Date	Topic	Class Activity or Assignment	Case Study or Technique	Readings
1	8/31	introductions and whatnot, defining conservation biology	—	—	—
2	9/5	values of biodiversity; Pleistocene overkill and ecological anachronisms	—	—	**Novinger and Rahel**
2	9/7	the shifting baseline syndrome; single-species conservation: conservation genetics	—	case studies: hybridization of cutthroat trout; conservation of "low profile" species	**Dreitz**
3	9/12	single-species conservation: demographic stochasticity	—	case study: keystone, umbrella, and flagship species; technique: projection matrices	**Ripple et al; Ford et al; Ripple et al 2**
3	9/14	single-species conservation: demographic stochasticity continued		technique: randomization and bootstrapping	—
4	9/19	population viability analysis	tutorial #1: projection matrices	—	—
4	9/21	population viability analysis continued	—	case study: sage grouse as umbrella species in the Intermountain West	**Marris**
5	9/26	multi-species conservation; large-carnivore conservation	help session for tutorial #1	case study: wolf reintroduction to the GYE	—
5	9/28	field trip to captive breeding facility for Wyoming toads	**tutorial #1 due by 5pm**	—	—
6	10/3	**test 1--through material up until and including 26 Sep**	—	—	**Presentation 1 Groups meet with Jake before this date**
6	10/5	taxon sampling and unequal sampling effort	tutorial #2: rarefaction	technique: individual- and sample-based rarefaction curves	**Beston et al**
7	10/10	**presentations: single- versus multi-species conservation**	—	—	—
7	10/12	landscape-level conservation: applications of source-sink and island biogeography theory to conservation	—	case study: exploitation of cougars in Utah	**Stoner et al**
8	10/17	guest lecture	**presentation 1 evaluations due by 5pm**	—	—
8	10/19	applications of island biogeography theory to conservation	—	case study: nest predation of sage grouse technique: likelihood and odds	**Bui et al**
9	10/24	island biogeography theory continued; occupancy modeling and non-detection errors	help session for tutorial #2	—	**Presentation 2 Groups meet with Jake before this date**
9	10/26	occupancy modeling continued; causes and consequences of climate change	**tutorial #2 due by 5pm**; tutorial #3: occupancy modeling	case study: public perception of climate change in the United States	**Climate Science Panel**
10	10/31	**presentations: federal versus local regulation of climate change**	—	—	—

10	11/2	**test 2--through material from 21 February through 30 March**	—		—
11	11/7	impacts of climate change on wildlife	help session for tutorial #3 and test 2; **tutorial #3 due by 5pm**	case study: exposure of wildlife to energy development in Wyoming	**Gilbert and Chalfoun**
11	11/9	exploitation and overexploitation of wildlife populations	**presentation 2 evaluations due by 5pm**	case study: trophy hunting in North America	**Monteith et al Methods and Results; Presentation 3 groups meet with Jake before this date**
12	11/14	test 2 answers; overabundance and cultural carrying capacities	tutorial #4: distance sampling	case study: wildlife services and animal damage control; technique: estimating detection functions	**Bergstrom et al**
12	11/16	guest lecture	—	—	—
13	11/21	**presentations: pros and cons of consumptive use of wildlife**	—	—	**Presentation 4 groups meet with Jake before this date**
14	11/28	species introductions and reintroductions	help session for tutorial #4; **presentation 3 evaluations due by 5pm; tutorial #4 due by 5pm**	case study: predictors of reintroduction success	**Middleton et al**
14	11/30	**presentations: conservation in protected areas versus human-occupied landscapes**	—	—	—
15	12/5	the appealing oxymoron of sustainable development	**presentation 4 evaluations due by 5pm**	case study: Mathusian-Darwinian dynamics in human societies	**Nekola et al**
15	12/7	the tragedy of the commons and human population growth	—	case study: property ownership and conservation	**Hardin; Pope Francis**

Wk	Date	Topic	Class or Field Activity	Case Study or Technique	Text Reading	Paper(s)
1	8/24	introduction to course	—	—	—	—
1	8/26	introduction to conservation biology: what are we trying to conserve?	—	megafaunal (re)introductions to the western U.S.	15-25	Donlan et al; Kodric-Brown and Brown
2	8/31	biology of small populations: conservation genetics	—	hybridization of cutthroat trout	384-395, 397-400	Novinger and Rahel 2003
2	9/2	biology of small populations: demographic stochasticity	debate #1: conservation of species vs process	conservation of "low profile" species	419-424	Dreitz 2006
3	9/7	predicting risk of extinction	tutorial #1: program matlab	population viability analysis	432-440	Reed et al 2002
3	9/9	habitat fragmentation and metapopulations	—	urbanization in the Rocky Mtns	tba	tba
4	9/14	island biogeography	*tutorial #1 hw due*	ecologically-scaled landscape indices	tba	tba
4	9/16	habitat degradation, sources, and sinks	—	shrub encroachment and overgrazing	tba	tba
5	9/21	—	camera trapping and/or small mammal sampling	—	—	—
5	9/23	**exam 1**	—	—	—	—
6	9/28	—	point counts for songbirds	—	—	—
6	9/30	estimating non-detection errors of rare and elusive species	tutorial #2: program presence	occupancy modeling 1	tba	tba
7	10/5	ecosystem-level conservation	debate #2: species- vs ecosystem-level conservation	whitebark pine ecosystems in the Rocky Mtns	tba	tba
7	10/7	community-level conservation: species interactions, hotspots, and endemism	*tutorial #2 hw due*	the IUCN red list and global bird diversity	tba	tba

Wk	Date	Topic	Class or Field Activity	Case Study or Technique	Text Reading	Paper(s)
8	10/12	community-level conservation: diversity estimation	tutorial #3: program estimate S	rarefaction	tba	tba
8	10/14	conservation of protected and multi-use areas	—	brown bear populations in the Greater Yellowstone Ecosystem	tba	tba
9	10/19	conservation of human-occupied areas	*tutorial #3 homework due*	sage grouse and energy development	tba	tba
9	10/21	climate change	debate #3: proactive vs reactive amelioration of climate change	range shifts and climate envelope models	tba	tba
10	10/26	—	distance sampling for ungulates tutorial #4 hw due	—	—	—
10	10/28	**exam 2**	—	—	—	—
11	11/2	overabundance and overexploitation	debate #4: consumptive use vs animal rights	trophy hunting in the northern Rocky Mtns	tba	tba
11	11/4	sustainable yields	tutorial #4: program distance	abundance estimation	tba	tba
12	11/9	exotic and invasive species: causes and consequences	—	global patterns of species introductions on island systems	tba	tba
12	11/11	exotic and invasive species: management and mitigation	*tutorial #4 homework due*	cheatgrass invasion of sagebrush-steppe ecosystems	tba	tba
13	11/16	species reintroductions and ecosystem restoration	debate #5: assisted migration as a conservation strategy	California condors in the southwestern U.S.	tba	tba
13	11/18	design of protected areas	tutorial #5: program R	conservation challenges in the Channel Islands	tba	tba
14	11/23	environmental economics and ecosystem services	—	pollination of agroecosystems	tba	tba
14	11/25	**thanksgiving**	**thanksgiving**	**thanksgiving**	—	—
15	11/30	conservation challenges in the developing world	—	hirola antelope and tribalism in eastern Kenya	tba	tba
15	12/2	conservation challenges in the industrialized worlds	*tutorial #5 homework due*	incentive-based conservation	tba	tba