Conservation Biology
Special topics (3 credit hours)
BIOL 4803
SPRING 2015

Syllabus

Professor:
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Required Textbook: *Essentials of Conservation Biology*, fifth edition, by R. B. Primack, 2010, Sinauer Assoc., Sunderland, MA

Prerequisites: BIOL 1510 or BIOL 1511

Course Objectives and Goals: Conservation Biology is the scientific study of the phenomena that affects the maintenance, loss and restoration of biological diversity. Conservation biology is an applied field that is rapidly evolving therefore as additional information is discovered on ecosystem dynamics, species interactions and the biology of endangered organisms, the appropriate conservation strategies may change. The goal of this class is to review the biological knowledge that is essential to conservation ranging from genetics to ecosystems and from small to broad scales. The key competencies to gain are to think critically about scientific findings, see where uncertainties and opportunities for new research lie and use biological findings as tools for conservation initiatives. Topics covered include: 1) the impacts of global warming, species invasion and habitat destruction on biodiversity, 2) strategies developed to combat these threats and 3) the consideration of key economic and ethical tradeoffs. Special attention will be paid to current debate and controversy within this rapidly emerging field of study. The overall objective of the course is to introduce students into the field of conservation biology, as well as enable them to make informed conservation decisions of local, national and international attention.

Description: Conservation biology is often referred to as a "discipline with a deadline" due to the rapid decline of many established ecosystems around the world. Conservation biology is an interdisciplinary field that is tied closely to ecology in researching the dispersal, migration, demographics, effective population size, inbreeding depression, sociological and economic dimensions of conservation, resource management and minimum population viability of rare or endangered species. Rapid human population growth coupled with widespread consumption of natural resources and habitat destruction is resulting in the extinction or endangerment of a huge proportion of living species on earth. As this is a relatively young discipline that integrates overall ecosystem function with the identification and biology of organisms and processes; the information used for conservation initiatives rapidly changes as new information is uncovered.

Learning Objectives:
Upon completion of this course students will be able to:
1. Describe the major approaches to conservation, including their differences and common

threads,
2. Demonstrate how ecological principles are currently applied to conservation and cite examples,
3. Demonstrate an understanding of the ecological principles upon which conservation approaches are based,
4. Integrate interdisciplinary approaches to major conservation problems including the tradeoffs between social, political and economics factors that affect conservation,
5. Understand basic conservation biology issues
6. Have scientific discussions centered around the analysis of current scientific literature.

This course is designed for you to match classroom learning with at least 4 or more additional hours of study each week. When you add in assignments and time spent in class and recitations, the total commitment will be approximately 10 hours per week. You will do well in the course if you grow a solid foundation by building understanding of the early concepts, and layering these in a cumulative way as the semester progresses. It is very difficult to recover if you let things go near the beginning or middle, since the material is inter-related and requires understanding of earlier ideas. Memorizing is not the answer.

Attendance: Attendance of all lectures is strongly encouraged since material not covered in the readings will be presented. Quizzes and learning catalytic questions will be given only in lectures. Learning catalytic questions will be unannounced but you can count on them being held almost every class, including right at the beginning and at the end of class. There is no make-up for missed questions and they will be worth 140 points based upon the % of questions that you answer correctly.

Learning Accommodations: If needed, I will make classroom accommodations for students with documented disabilities. These accommodations must be arranged in advance and in accordance with the ADAPTS office (http://www.adapts.gatech.edu)

Honor code: Academic dishonesty will not be tolerated. This includes cheating, lying about course matters, plagiarism or helping others commit a violation of the honor code. Plagiarism includes reproducing the words of others without both the used of quotation marks and citation. Your conduct in this course is expected to conform to the GT Student Honor Code (http://www.honor.gatech.edu/). I urge you to consult this for a full definition of your rights and responsibilities.

Course Format: The course will be presented in a lecture-discussion format. Assigned reading material needs to be done prior to the lecture, as this is intended to provide a background on the lecture topic. Lectures will build off of reading materials, providing additional examples, highlighting new and novel studies in the field and presenting alternative explanations that may conflict with the textbook. Unless otherwise stated, students are responsible for all materials covered in lectures and outlined in the syllabus. This course will attempt to improve your ability to think critically, problem solve, synthesize science concepts, and communicate them effectively. Your ability to demonstrate these skills will be assessed using both exams and independent projects. In conjunction with the lecture material, discussion sessions will be held during the last half of lecture once a week. Participation in the discussion section is mandatory and each missed discussion section will result in 0 points for participation.

Grades: Grades will be assigned according to the following scale: 90-100 A, 80-89 B, 70-79 C, 60-69 D, below 60 F. We may curve the exams if necessary, and reserve the right to change

these standards based on class performance. You will be evaluated on three activities. First, your grade will be determined by three exams (two mid-terms and one cumulative final exam) given over the semester. Second, by quizzes and learning catalytic questions given in lectures and discussion sections. Both quizzes and learning catalytic questions will be given frequently on a random basis. The remaining part of your grade will be based on a term paper and presentation. Term papers will be completed in the form of a "review article" within the journal *Conservation Biology*. Information about the manuscript length and format is available online at the journal's website. You will be expected to use scientific literature (journals, technical reports) rather than textbooks or websites. Details of the format will be described in class.

Exam 1	Weeks 1-5	100 points
Exam 2	Weeks 6-10	100 points
Final Exam	Weeks 1-15	200 points
LC questions	Up to 140 points	140 points
Term Paper	See Information Below- small group assignments	100 points
Term Paper Summaries	See Information Below- individual assignment	50 points
Term Paper Presentation	See Information Below- small group assignments	60 points
Research Report	***GRADUATE STUDENTS ONLY***	***100 points***
Research Report Presentations	***GRADUATE STUDENTS ONLY***	***50 points***
Course total Undergraduate Students		**750 points**
Course total Graduate Students		**900 points**

Required learning catalytic: Learning catalytic will be used as a way to assess your understanding of the material being questioned in class. This will provide you with regular feedback on the level of your understanding of the course material. Questions adding to 190 points will be asked however, no make up questions or adaptations will be done to accommodate absences (excused or not), so points earned are capped at 140. NO exceptions will be made for this, to earn the points you must be in-class paying attention.

Use of electronics during classes: As learning catalytic requires the use of electronics for feedback, laptops, phones or tablets will be necessary for some aspects of the course. However, phones need to be placed on silent or do not disturb mode before class starts, and turn the sound off of your computer. Using any of the electronic devices for anything other than taking notes or submitting information to the instructor is prohibited. Scrolling through social media websites or working on other homework assignments not only prevents you from receiving the class information but also is a distraction to other students trying to pay attention. Students caught using electronic devices for anything not necessary for the lecture, will be asked to leave and any learning catalytic questions asked, or participation that is required during the missed class will be lost.

Class notes: Slides should be downloaded (as PDF files) from the course t-square site (under "Resources" on the left once you have logged in and chosen BIOL 4803) and printed prior to the class session dealing with that material. The slides are not designed to be comprehensive – they serve as a template for you to write on during class, adding your own insights as well as those provided by the instructor. It is very important to develop your own style of independent note-taking in college courses. Every student remembers and integrates new ideas differently, so you should tailor your note-taking to suit your own background and learning style. A good rule of thumb is that ***you should be adding to the downloaded notes at least as much of your own commentary as the instructor adds from the front of the room, so that when you study from these notes later, you find yourself thinking, "Oh, THAT is what the professor meant".***

Material covered/student responsibilities: You are responsible for all material presented in class, in take-home assignments, and assigned readings. You are also responsible for knowing about announcements made in class, posted on t-square, or emailed to your GT email address. We do not send emails to accounts other than your official GT email address. You need to check the t-square site and your email account regularly.

Re-grades: Re-grade requests must be submitted within one week after the assignment or exam was available to be picked up. All re-grade requests must be submitted according to the following procedure: ***Write a summary of what you want re-graded (i.e., question number), an explanation of why your answer is correct, and attach that page to the front of the entire assignment***. Turn in the request to Dr. Dixson in class, at her office hours, or in her office in CE A-124. Please note that when submitting something for a re-grade, the entire assignment may be subject to regarding. If a grading mistake is discovered that resulted in you receiving too many points, your grade could be lowered. *Re-grade requests will NOT be accepted after one week after the assignment was available for return, even regarding errors in calculating your grade.*

Term Paper

All term papers will be completed either individually for graduate students or in small groups for undergraduates (4-6 individuals per group). Each term paper will be completed in the form of a "review article" within the journal of Conservation Biology. A lottery will be conducted during the second full week of classes to assign a ranking to each student. Students will then pick one of eight review topics listed below- once a topic has been picked by the correct number of students, a group is formed. The topics include:

1. Habitat corridor effectiveness- particularly of large corridors as opposed to smaller ones characterized by over passes.

2. Genetic diversity of non-native populations

3. Patterns of polypoid speciation events involving non-native populations

4. Patterns in translocations of species outside of the native ranges for conservation purposes

5. Evaluating the conservation value of farmed land managed to be biodiversity friendly

6. Effectiveness of terrestrial conservation initiatives on marine locations

7. Captive conservation strategies for critically endangered species

8. Critique the current CITES conservation listing for endangered species. How is this effective and what is missed by the current system?

A student could suggest a topic but it needs to be approved by the instructor and there must be at least 4-6 individuals willing to work on the topic.

For Undergraduates: Each review paper will review a minimum of 10 studies relevant to the topic; this **does not** include background literature that sets the context for the work. Each student will be responsible for summarizing 2 data papers (i.e. that comprises the analyses or review per se) and 2 papers that help to set the context for the work. No overlap among these papers is permitted among students (i.e. each student will read and summarize different papers). Each context paper will be correctly cited (according to the Conservation Biology journal standard) and described in a short paragraph (150-200 word length), which summarized the work and explains how it informs the larger work of the team. Each data paper's summary should include a one sentence description of the following items: 1) place of study, 2) focal unit of study, 3) principal finding or result, 4) secondary finding or result, 5) implications for the topic of review. Word limits are strictly enforced. Please do not go over the 200-word length per paper or points will be lost. Being a concise effective writer is a very important skill.

Each student will submit their set of paper summaries to the group. These summaries will also be submitted to the professor and graded. Team members will work together to produce the review paper, which will also be graded. Summaries are meant to help the group review paper; but will be graded individually. A portion of the individual's grade will come from their summaries, a portion from the paper itself and another portion from the group presentation (See grade breakdown above).

Groups will give a short oral presentation will be conducted during class. Time limits will be strictly enforced with points lost if groups go over the allotted time.

HELPFUL TIP: Please make sure that you leave enough time to actually proof read the review paper. While it is completely acceptable and encouraged to assign each member of the group a different smaller subtopic to become familiar with, points will be lost if the final review papers read as if they are cut and pasted together.

Summaries are due Week 7; Final paper is due Week 14

Additional Assignments for Graduate Students

Term paper described above will be assessed on the quality of the review alone and will be conducted individually.

Additionally graduate students are required to write a research report on an endangered species of their choice (each species can only be chosen once). Species will be chosen on a first come first serve basis. Please email Dr. Dixson your species of choice to determine if it has already been chosen. Reports should highlight: 1) why is the species endangered? 2) what are the current conservation initiatives being used to save the species? 3) are the conservation measures effective?, propose additional/alternative measures? 4) and what political, social and economic issues are impacting the conservation of the chosen species? As described above, each research

report should be completed in the form of a "review article" within the journal of Conservation Biology. Information about the manuscript length and format are available online at the journal's website.

Individual in-class PowerPoint presentations will be given detailing the information of the endangered species report. Reports will be 10 minutes in length with 5 minutes of question time. (The time may change based on the number of graduate students that enroll in the course and will be adjusted prior to the first day of class).

Curriculum Schedules

Week 1- Introduction (Rohan Brooker) / What is conservation biology? (Chapter 1)/ What is biological diversity? (Chapter 2&3)

Week 2- Ecological Economics and value of diversity (Chapter 4)/ Indirect use value (Chapter 5)/ Discussion I

Week 3- Labor Day/ Ethical values (Chapter 6)/ Discussion II

Week 4- Extinction (Chapter 7)/ Vulnerability to extinction (Chapter 8)/ Discussion III

Week 5- Habitat destruction and fragmentation (Chapter 9)/ Global climate change and extinction (Chapter 9)/ Discussion IV

Week 6- Exam 1 (September 22 Covers weeks 1-5)/ Small populations and applied population biology (Chapter 11)/ Discussion V

Week 7- Species Invasions (Chapter 10)/ Infections disease and wildlife trade (Chapter 10)/ Discussion VI **Individual summaries due (October 1)/ Graduate student species paper due (October 3)**

Week 8- Population Biology and Minimum viable populations and extinction debt (Chapter 12)/ New Populations (Chapter 13)/ Discussion VII

Week 9- Fall break/ Ex-situ conservation strategies (Chapter 14)/ Discussion VIII

Week 10- Graduate Student Species Presentations (2 per day)

Week 11- Protected Areas (Chapter 15)/ Network of protected areas (Chapter 16)/ Managing protected areas (Chapter 17)

Week 12- Exam 2 (Covers weeks 6-10)/ Conservation outside protected areas (Chapter 18)/ Discussion IX

Week 13- Restoration Ecology (Chapter 19)/ Marine Conservation/ Discussion X

Week 14- Undergraduate Presentations- Term paper due (Monday November 17th)

Week 15- Sustainable Development (Chapter 20)/ International conservation (Chapter 21)/ Thanksgiving Break

Week 16- Future Initiatives (Chapter 22)/ Discussion XI / Final Review

Final Week- Final Exam (Covers all material)

Discussion Sections

(5 new papers relevant to these topics will be chosen and provided on T-square)

Discussion I: Functioning of novel ecosystems
Discussion II: "Re-wilding"
Discussion III: Tropical deforestation and extinction
Discussion IV: Extinction risk of climate change
Discussion V: Invasions, ethics and objectivity
Discussion VI: Climate change and infectious disease
Discussion VII: Managed relocation
Discussion VIII: Dissecting a multiple species habitat conservation plan
Discussion IX: Advocacy and conservation
Discussion X: Marine conservation
Discussion XI: Human welfare and conservation