IB 451 Conservation Biology

4 credit hours

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Course Description: Synthesis of conservation biology with an emphasis on the preservation of biological diversity and its evolutionary potential. Laboratory will include reading and discussing primary literature, an introduction to the use of modern molecular techniques in conservation biology and field conservation problem solving. Same as CPSC 436 and ENVS 420.

Prerequisite: IB 203 or consent of instructor.

Requirements that the Course Meets: Major in Integrative Biology (elective), Minor in Ecology and Conservation

Lectures: 9:30-10:50 am TTH on Zoom
Discussion/Computation Labs: T 12-1:50, W 12-1:50 pm on Zoom

Course Site: Moodle: https://online.illinois.edu/getting-started/learning-management-systems/moodle

Lab Manual: J.P. Gibbs, M.J. Hunter and E.J. Sterling. 2008. Problem-Solving in Conservation Biology and Wildlife Management. Blackwell Publishing, Second Edition.

Text Book: B.J. Cardinale, R.B. Primack, and J.D. Murdoch. 2020. Conservation Biology. Oxford University Press.

Student Learning Outcomes: 1) Students will demonstrate broad-based knowledge of the fundamentals of Conservation Biology, 2) Students will demonstrate skills in the observation and experimental study of organisms, using both field-based and laboratory-based approaches, 3) Students will demonstrate skills in identifying, accessing, comprehending and synthesizing scientific information, including interpretation of the primary scientific literature. This includes understanding key questions and hypotheses, interpreting results and conclusions, and evaluating quality through critique, 4) Students will demonstrate the ability to communicate original scientific work in the form of an oral presentation.

Emergencies

General Emergency Response Recommendations

Run>Hide>Fight Video

Building Emergeny Exits

Policies

Attendance and Makeup Policy - Office of the Dean of Students - http://studentcode.illinois.edu/article1_part5_1-501.html

Academic Integrity

According to the Student Code, `It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.' Please know that it is my responsibility as an instructor to uphold the academic integrity policy of the University, which can be found here: http://studentcode.illinois.edu/article1_part4_1-401.html.

Disability Accomodations

To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class are asked to see me as soon as possible. https://www.disability.illinois.edu/

Lecture

January 26 - Course Introduction
January 28 - What is Conservation Biology
February 2 - Conservation: A Historical Perspective
February 4- "Wild by Law"
February 9 - How many species are there?
February 11 - Loss of Biodiversity: Rates, Causes, Consequences, Perspectives
February 16 - Population Bottlenecks & Genetic Diversity
February 18 - Effective Population Numbers
February 23 - Student Presentations
February 25 - Exam #1
March 2 - Molecular versus Quantitative Genetic Perspectives and Conservation
March 4 - Gene Flow/Management measures; One-Migrant-Per-Generation
March 9 - Inbreeding/Outbreeding Depression
March 11 - Student Presentations

March 16 - **Inbreeding/Outbreeding Depression**
March 18 - **Demographic/Environmental Stochasticity**
March 23 - **Single Species Conservation: Choosing Species**
March 25 - **Student Presentations**
March 30 - **Habitat Fragmentation**
April 1 - **Exam #2**
April 6 - **Student Presentations**
April 8 - **Planet in Peril – Part 1**
April 13 - **No class – Non-Instructional Break Day**
April 15 - **Planet in Peril - Part 2**
April 20 - **Student Presentations**
April 22 - **Endangered Species Act**
April 27 - **Invasive Species**
April 29 - **Conservation Forensics/Adaptive Management**
May 4 - **Review Session for Final Exam**
May 6 - **Reading Day**

Lab

Lab #1 (Week of February 1nd)
Discussion Reading - The Land Ethic
Discussion Reading - What is Conservation Biology?
Discussion Reading - What is Conservation Science?
Response Letters
Lab #2 – (Week of February 8th)
In Class Exercise - An Exploration of the IUCN Red List
Discussion Reading – Decline of North American Avifauna
Discussion Reading – Sixth Mass Extinction
Discussion Reading – Biomass Distribution on Earth
Week of February 15th – No Labs – Non-Instruction Break Day
Lab #3 – (Week of February 22nd)
In Class Exercise - Genetic Drift
Discussion Reading – Conservation of Biodiversity in the Genomics Era
Lab #4 – Week of March 1st)
In Class Exercise - Landscape Genetics
Discussion Reading – Great Grey Owl – Genetic Diversity/Structure
Lab #5 – (Week of March 8th)
Discussion Reading – Managing the Middle: A Shift in Conservation Priorities based on the Modification Gradient
Discussion Reading – Wilderness Areas Halve the Extinction Risk of Terrestrial Biodiversity
Lab #6 – (Week of March15th)
Discussion Reading – Importance of Small Habitat Patches for Biodiversity

Discussion Reading – Proactive Conservation to Prevent Habitat Losses to Agricultural Expansion

Week of March 22nd – No Labs – Non-Instruction Break Day

Lab #7 – (Week of March 2th)

Discussion Reading - Habitat Fragmentation – Ecosystem Effects

Discussion Reading – Habitat Alteration and Species Loss

Habitat Fragmentation and Biodiversity – Key Findings, Future Challenges

Lab #8 – (Week of April 5th)

Discussion Reading – Why Biodiversity is Important to the Functioning of Real-World Ecosystems

Discussion Reading – Realistic Species Losses Disproportionately Reduce Grassland Resistance to Biological Invaders

Week of April 12th – No Labs – Non-Instruction Break Day

Lab #9 – (Week of April 19th)

Discussion Reading – Increasing the Effectiveness of the Endangered Species Act

Lab #10 – (Week of April 26th)

Discussion Reading – Alien versus Native Species as Drivers of Extinction

Discussion Reading – Saving Endangered Species Using Adaptive Management

Lab #11 – (Week of May 3rd)

Discussion Reading - Contemporary evolution meets conservation biology

Discussion Reading - Rapid Evolution of Egg Size in Captive Salmon

Discussion Reading - What if Extinction is not Forever?

Exams (online)

Each exam will be taken online for the duration of one class period. These exams are open book and will be turned in at the end of the exam via email to the instructor.

Graduate and Undergraduate Presentations

Each graduate and undergraduate student enrolled in the course will be required to select and present one case history during the semester. You will pair-up with one other graduate or undergraduate student and split the presentation for delivery. You can choose a topic of interest (I can also assist you in choosing a topic). Presentations will be in a Powerpoint format. Presentations should last 15 minutes including approximately 2-3 minutes for questions. Students will be graded on their presentations. The purpose of this exercise is to provide students an opportunity to prepare and present lecture materials for a class and to provide real-world examples of conservation in action.

Discussion/Lab Section

The Discussion/Lab section consists of four components. 1. Lab reading material (found as pdf files) and discussion, 2. Exercises, 3. Workbook and student generated questions following the exercises to help address real world problems in conservation.

Participation - Discussions

Participation is essential to the discussion section. We will expect everyone to contribute and will "encourage" people who do not regularly contribute. More importantly, participation in discussion is essential to your own education both in terms of your understanding of concepts related to conservation biology and in honing your verbal skills. I expect each student to come prepared with at least two questions about one or more of the papers each week to share with the class to help stimulate discussion and ensure everyone has read the assignment.

Grading

Three lecture exams - 100 points each = 300 points total

Lab - 11 labs, 10 points each = 110 points Total points = 110

Graduate/Undergraduate led lectures - 50 points, one each = 50 points total

Total course points – 460

Grading Scale (as a %)

98.00 – 100.00	A+
92.00 – 97.99	A
90.00 – 91.99	A-
88.00 – 89.99	B+
82.00 – 87.99	B
80.00 – 81.99	B-
78.00 – 79.99	C+
72.00 – 77.99	C
70.00 - 71.99	C-
68.00 – 69.99	D+
62.00 – 67.99	D
60.00 - 61.99	D-
Below 60	F