

## **IB 451 Conservation Biology**

4 credit hours

### **Professor Ken N. Paige**

School of Integrative Biology

Department of Evolution, Ecology and Behavior

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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, Face to face in room 2020B Natural History Building

**Discussion/Computation Labs:** T 12-1:50, W 12-1:50 pm, Room 4004 Natural History Building

**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 Emergency Exits](#)

## Policies

[Attendance and Makeup Policy - Office of the Dean of Students -](#)

[http://studentcode.illinois.edu/article1\\_part5\\_1-501.html](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](http://studentcode.illinois.edu/article1_part4_1-401.html).

## Disability Accommodations

[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 17 - Course Introduction
- January 19 - What is Conservation Biology
- January 24 - Conservation: A Historical Perspective
- January 26 - "Wild by Law"
- January 31 - How many species are there?
- February 2 - Loss of Biodiversity: Rates, Causes, Consequences, Perspectives
- February 7 - Population Bottlenecks & Genetic Diversity
- February 9 - Effective Population Numbers
- February 14 - Student Presentations
- February 16 - Exam #1
- February 21 - Effective Population Size & Genetic Diversity
- February 23 - Molecular versus Quantitative Genetic Perspectives and Conservation
- February 28 - Gene Flow/Management measures; One-Migrant-Per-Generation
- March 2 - Student Presentations
- March 7 - Inbreeding/Outbreeding Depression
- March 9 - Demographic/Environmental Stochasticity
- March 11-19 - Spring Break
- March 21 - Single Species Conservation: Choosing Species
- March 23 - Student Presentations
- March 30 - Habitat Fragmentation

March 28 - Habitat Fragmentation  
March 30 - Exam #2  
April 4 - Student Presentations  
April 6 - Planet in Peril – Part 1  
April 11 - Student Presentations  
April 13 - Invasive species  
April 18 - Student Presentations  
April 20 - Climate Change and Biodiversity  
April 25 - Endangered Species Act  
April 27 - Endangered Species Act  
May 2 - Review Session for Final Exam  
May 4 - Reading Day

## Lab

### Lab #1 (Week of January 24<sup>th</sup>)

Discussion Reading - The Land Ethic

Discussion Reading - What is Conservation Biology?

Discussion Reading - What is Conservation Science?

Response Letters

### Lab #2 – (Week of January 31<sup>st</sup>)

In Class Exercise - An Exploration of the IUCN Red List

Discussion Reading – Decline of North American Avifauna

Discussion Reading – Sixth Mass Extinction

### Lab #3 – (Week of February 7<sup>th</sup>)

In Class Exercise - Genetic Drift

Discussion Reading – Conservation of Biodiversity in the Genomics Era

### Lab #4 – Week of February 14<sup>th</sup>)

In Class Exercise - Landscape Genetics

Discussion Reading – Evaluating the genome-wide impacts of species translocations:  
the greater prairie-chicken as a case study

### Lab #5 – (Week of February 21<sup>th</sup>)

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 February 28<sup>th</sup>)

Discussion Reading – Importance of Small Habitat Patches for Biodiversity

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

### Lab #7 – (Week of March 7<sup>th</sup>)

Discussion Reading - Habitat Fragmentation – Ecosystem Effects

Discussion Reading – Habitat Alteration and Species Loss

Habitat Fragmentation and Biodiversity – Key Findings, Future Challenges

## **March 11-19 Spring Break**

### **Lab #8 – (Week of March 21<sup>st</sup>)**

**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**

### **Lab #9 – (Week of March 28<sup>th</sup>)**

**Discussion Reading – Lessons from 30 years of population viability analysis of wildlife populations**

### **Lab #10 – (Week of April 4<sup>th</sup>)**

**Discussion Reading - Increasing the Effectiveness of the Endangered Species Act**

### **Lab #11 – (Week of April 11<sup>th</sup>)**

**Discussion Reading – Alien versus Native Species as Drivers of Extinction**

**Discussion Reading – Saving Endangered Species Using Adaptive Management**

### **Lab #12 – (Week of April 18<sup>th</sup>)**

**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?**

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## **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 - 12 labs, 10 points each = 120 points Total points = 120

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

Total course points – 470

#### 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