

***Biology 5300: Ecology
Hybrid and Writing Intensive with Civic Engagement***

This 4 credit 6 hour laboratory course is an **elective** for **biology majors** who are interested in studying local ecosystems. Ecology is the study of interactions between organisms and their environment. It entails study of the structure, function and interactions of populations, communities, ecosystems, and the flow of energy and cycling of nutrients therein. Human impacts on and remediation of these systems will also be examined.

FORMAT: This course will be taught as a **hybrid**, so we only meet for **lab in person**. All labs will entail **outdoor** activities and/or local **field trips** (Plumb Beach, Coney Island Aquarium, Prospect Park Zoo, Brooklyn Botanic Garden, American Museum of Natural History, Central Park, The Met, etc.) **Lectures are online** and include narrated PowerPoints, discussion threads, videos, and student presentations. Students will engage in active learning, generating and testing hypotheses and reporting your findings.

Writing Intensive Course

This course meets the college's writing intensive graduation requirement. This class is built around the premise that writing is less about what the product *is* or looks like, but what the process of writing *does* for the writer. That is, the process helps writers discover ideas in and about texts (generative writing) and make sense of their own thinking as it becomes increasingly more complex and as they move deeper into their course reading (explorative writing). Therefore, much of your learning about the texts for this course will happen during your own writing process, through a myriad of informal and formal writing assignments.

ETIQUETTE: Please maintain a respectful and collaborative learning environment. Plagiarism or use of chat AI, or copying text or ideas as though they are your own, and/or cheating will not be tolerated. Use of any electronic devices for ANY reason during tests is considered cheating. Only positive feedback and constructive interactions must be maintained at all times.

TIPS FOR SUCCESS: Log in each week and review all lecture content. Complete and submit all assignments on time and to the best of your ability. Attend or listen to recorded Q&A sessions to learn about the weekly assignments and labs. Be prepared to participate fully in all field based or trip based labs. You will be collecting field data using field based tools and techniques.

CIVIC ENGAGEMENT: Students will participate in multiple Citizen Science research projects which contribute data to local, regional and global species conservation efforts. These include Gotham Coyote, Zooniverse, Tagging of Horseshoe Crabs and iNaturalist. Students who complete these projects and write a reflection of their work are eligible to receive a CE certificate and credit.

OER TEXT: *Essentials of Ecology* Townsend, Begon and Harper 3rd Edition Blackwell Publishing
(Free PDF <https://epdf.tips/queue/essentials-of-ecology.html>)

NO LAB MANUAL: All labs are inquiry based and student driven.

GRADES:	Lab reports (10)	30%
	Discussion threads (10)	20%
	Term paper	10%
	Narrated PowerPoint	10%
	Unit tests (2)	10%
	Cumulative final exam	20%
	TOTAL:	100%

TESTS: **Two** unit tests and a **final exam** will be administered online. Each test is unique and will be comprised of multiple choice questions randomly drawn from a test bank. All tests will be available for 24 hours.

DISCUSSIONS: Weekly discussion threads are essentially a **first draft** of each section of the term paper. These require that you relate the weekly topics to the species you are focused on for your final report. **Feedback** given each week, should therefore be integrated into **the final draft** of your term paper, which will in turn form the basis of your final narrated Power Point presentation.

LABS: Each week's lab will entail an active learning, inquiry-based investigation of an ecological question. Students will develop and test hypotheses, collect and analyze data, interpret its meaning, then report their findings and relate their data to the peer literature.

TERM PAPER: A **four** page report must be on the **species** you selected at the start of the semester which **MUST** be approved by the professor. This is worth **10%** of your final grade.

The report must be supported by the **same** summaries of peer reviewed scientific sources used in your **discussion** posts. Each section below must be clearly indicated by the following **headings** and must contain one half page of text based on the specified citations as follows:

1. **Introduction** (physical **description** and **taxonomy** all from www.iNaturalist.org)
2. **Population** (one peer article on **population surveys**)
3. **Competition** (one peer article on its **interspecific** OR **intraspecific** competition)
4. **Predation** (one peer article on its **predators** OR its **prey**)
5. **Symbioses** (one peer article on its **parasites** OR a **mutualists**)
6. **Community** (one peer article on its **niche**)
7. **Habitat** (one peer article on the **natural habitat** AND/OR **introduced habitat**)
8. **Conservation Status** (www.iucnredlist.org status, threats, laws and population trends)

Literature Cited: All articles/sources referenced in the report must be alphabetically listed at the end as follows (basically APA format)

1st author last name, first initial, 2nd, 3rd, etc. (year). Title of article. *Name of Journal*. Issue/Volume: Page #s.

This report must be typed in 12 point font, 1.5 spacing and saved as a Word doc. The literature section must be at the end. Pages must be numbered clearly. No cover page. No images or charts. ALL literature sources must be referenced in the paper by 1st author's last name and year (Jones, 2001, Jones and Jones, 2020 or Jones et al. 2020). **NO QUOTES!** This report must include **eight** valid scientific sources along with a URL link to SIX articles, plus iNat and IUCN. The title of your report must include the common and scientific name and must be descriptive of the organism. In the body of the report, you may use the common name OR an abbreviated version of the scientific binomial instead of the common name eg Malay Civet (*Viverra zibetha*) now becomes *V. zibetha*.

ORAL PRESENTATION: A 10 minute, 10 slide narrated PowerPoint presentation based on your term paper will be made by each student during the final week. This will count as an additional 10% of your grade and must be narrated by you. The file name must include the name of the presenter and the species common name. Presentations must use 24 pt. font, high contrast, clear images and bulleted talking points. Each slide must have the same titles as specified above plus a title slide and a references. The presentation must contain a title page with the title of presentation, correct common and scientific species name, and name of the presenter. Each slide should have a relevant image of the topic (eg phylogeny, competitors, predators, prey, parasites, range map etc.).

EXTRA CREDIT: One point of extra credit up to 5 points (5% of final grade) will be given for each approved live/virtual lecture/volunteer day/hike/event attended and summarized during the semester.

MEASURABLE LEARNING OUTCOMES

1. Apply **methods** and processes of life science by designing, conducting and writing up scientific investigations.
2. Demonstrate proficiency in **quantitative** reasoning by analyzing, depicting, interpreting and comparing data.
3. Compare and contrast **evolutionary adaptations** of organisms under various environmental and ecological conditions.
4. Demonstrate an understanding of the **pathways of energy** transfer and matter cycling within living systems by constructing trophic pyramids, food webs and nutrient cycles.
5. Demonstrate an understanding of the **levels of biological organization** and interactions by describing different types of ecological interactions between individuals in populations, communities, and ecosystems.

LEARNING COMPETENCIES

ACTIONS TO MEET THESE

Become civically engaged	Contribute to local citizen scientist research projects
Exhibit scientific literacy	Search, read & summarize the peer literature
Apply the scientific method	Conduct independent inquiry investigations
Develop public speaking skills	Present research findings to your peers
Develop scientific writing skills	Craft a well written term paper based on peer literature
Become proficient in PowerPoint	Prepare and deliver a narrated PowerPoint
Become proficient in MS Word	Create a written term paper using MS Word
Become proficient in MS Excel	Manipulate data tables and graphs in Excel
Develop graphing skills	Build and interpret data graphs in Excel
Classify and identify species	Classify and ID local organisms using iNaturalist
Explain flow of energy/cycling of matter	Create a trophic pyramid and food web
Conduct mathematical calculations	Summarize data and run basic statistical analyses
Understand human impacts on nature	Conduct research on environmental issue
Differentiate between ecosystems	Compare physical and biological differences of habitats
Differentiate between global biomes	Compare local and global biomes
Understand animal behavior	Create and use an ethogram to observe behavior
Conduct biodiversity censuses	Survey local organisms near or on campus

- Mar 4 **Lecture 1:** Chapter 1- Introduction **Discussion 1:** Video introductions and species selection
 Mar 6 **Lab 1: ZOONIVERSE** On campus computer based lab (Citizen Science)
Meet in S-226 then move to nearby Computer Lab S-225
- Mar 11 **Lecture 2:** Chapter 5 - Populations **Discussion 2:** What does civic engagement look like to you?
 Mar 13 **Lab 2: iNaturalist POPULATION SURVEY** On campus computer lab (Citizen Science)
Meet in S-226 then move to nearby Computer Lab S-225
- Mar 18 **Lecture 3:** Chapter 6 Competition **Discussion 3:** Summarize peer article on competition
 Mar 20 **Lab 3: INTER AND INTRASPECIFIC COMPETITION** Scan sample foraging bird flocks
Meet in S-226 then move to KCC Beach and Manhattan Beach to collect data. ID with iNat
- Mar 25 **Lecture 4:** Chapter 7 Predation **Discussion 4:** Summarize peer article on predation
 Mar 27 **Lab 4: GULL PREDATION** Search campus for evidence of gull predation of invertebrates
Meet in S-226 then walk campus perimeter and parking lots to collect data
- Apr 1 **Lecture 6:** Chapter 8 Parasitism **Discussion 6:** Summarize symbiosis article
 Apr 3 **Lab 6: CRAB EPIBIONTS** Assessing the hitchhikers on the carapace of horseshoe crabs
Meet in S-226
- Apr 8 **Lecture 5:** Chapter 9 Communities **Discussion 5:** Summarize 2023 peer article on niches
 Apr 10 **Lab 5: TREE PHENOLOGY** Survey deciduous trees for bud burst and flushing behaviors
Meet in S-226 then move to tree lined area in front of S Building and Library **TEST 1**
- Apr 15 **Lecture 7:** Chapter 4.4 Aquatic Ecosystems **Discussion 7:** Summarize iNaturalist marine taxa
 Apr 17 **Lab 7: CONEY ISLAND AQUARIUM**
Meet at entrance to WCS Aquarium at Stillwell and 8th at 1:30pm
- Apr 22 - 30 *SPRING BREAK*
- May 6 **Lecture 8:** Chapter 4.1 Terrestrial Ecosystems **Discussion 8:** Summarize 2022 article on biome
 May 8 **Lab 8: AMERICAN MUSEUM NATURAL HISTORY** Biome comparison/Goodkin lab tour
Meet at main entrance to museum on Central Park West at 79th Street at 1:30pm
- May 13 **Lecture 9:** Chapter 14 Conservation **Discussion 9:** Summarize IUCN conservation status
 May 15 **Lab 9: PROSPECT PK ZOO or MET Museum** Conservation correlation
Meet at 1:30pm
- May 20 **Lecture 10:** Chapter 10 Biodiversity **TEST 2** **Discussion 10:** Literature review
 May 22 **Lab 10: BROOKLYN BOTANIC GARDEN** Biodiversity survey
Meet at BBG entrance at 455 Eastern Parkway near Empire Blvd at 1:30pm
- May 27 **Lecture 11** Field Ecology and Civic Engagement **Discussion 11:** Read Botton et al. 2017
 May 29 **Lab 11: PLUMB BEACH** Horseshoe Crab survey and tagging Term Paper Due
Meet at entrance to KCC campus at 12:40 or at Plumb Beach parking lot at 1pm
- June 3 **Lecture 12:** Horseshoe Crab Research **Discussion 12:** Civic Engagement reflections
 June 5 **Lab 12: PLUMB BEACH** Horseshoe Crab survey and tagging Narrated PowerPoint Due
Meet at entrance to KCC campus at 12:40 or at Plumb Beach parking lot at 1pm