

Faculty of Environmental and Urban Change
York University
Graduate Course Outline

Course: ENVS 5112 3.0 Ecology in Environmental Studies

Term: Fall 2024

Course Description

To learn the fundamentals of ecology ranging from the behaviour of individual organisms to landscape scale perspectives. This course is intended for students who have little or no background in ecological science.

Course Director

Dr. Gregory Thiemann

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Lectures: Wed. 11:30 am – 2:30 pm, HNES 102

Course consultation hours: Thurs 11:30 am – 12:30 pm via Zoom

Objectives:

- 1) To learn the fundamental logic of ecology: the identification of purpose, questions, hypotheses, investigative approaches, points of view, assumptions, inferences and implications
- 2) To understand the essential elements of ecology including perspectives on individuals, populations, and communities.
- 3) To provide a basic grasp on how to design an ecological study

Organization of the Course:

The course will be a mixture of lectures and class discussion. Students will lead seminar discussions of focal papers. I will post outlines of the lectures before class in Adobe PDF format.

There are a variety of reading materials for this course, some required, some recommended. The paper discussions will be broadly based around the general ecology topic(s) for the week. ***It is vital that you read the papers that will be discussed prior to coming to class.***

Requirements:

(a) 3 credits, (b) evaluation based on three assignments, one remote seminar presentation, and evidence of completion and comprehension of assigned readings.

Prerequisites and Limitations:

No prerequisite required. This is not a required course, but it will provide a foundation for understanding key concepts such as evolution, ecosystem functioning, and conservation of biodiversity.

Outline:

Assignments:

You will need to complete three assignments and one presentation to receive a passing grade in this course:

- Assignment #1 is a self-directed exploration of the scientific method in which you will select a focal species to examine in the field.
- Assignment #2 will be a data-driven analysis of the effects of predation and herbivory.
- Assignment #3 will be a critical review of a recent scientific paper of your choice
- Presentation: Each student will lead the class in a discussion of one of the weekly readings taken from the peer-reviewed ecological literature.
- Participation is based on substantive contributions to class discussion.

Reading List:*Recommended readings:*

- Any undergraduate-level ecology textbook. There are many options, but I like this one: Molles and Cahill. Ecology: Concepts and Applications. Canadian Edition. McGraw-Hill. (Multiple editions available online and at the library).

Week 1 (Introduction):

- a. Leopold, A. 1949. Excerpts from *A Sand County Almanac*. Pp 188-197, 251-258.
- b. Etkina, E. and D. Ehrenfeld. 2000. Helping ecology students to read. *BioScience* 50: 602-608.

Required readings:Week 2 (Evolution):

Gould, S. J. 1994. The evolution of life on the earth. *Scientific American* 271: 84-91.

Week 3 (Life History):

- a. Van de Walle J, Pigeon G, Zedrosser A, Swenson JE, Pelletier, F. 2018. Hunting regulation favors slow life histories in a large carnivore. *Nature Communications* 9:1100.
- b. Post, E. & Forchhammer, M.C. 2008. Climate change reduces reproductive success of an Arctic herbivore through trophic mismatch. *Philosophical Transactions of the Royal Society B: Biological Sciences* 363: 2367–2373.

Week 4 (Behavioural Ecology):

- a. Struller, F., Bauer, H., Yirga, G., & Vos, M. 2022. Growing up urban: hyena foraging groups and social structure at a city waste dump. *Frontiers in Conservation Science*, 3, 866836.
- b. Whitford, M.D., Freymiller, G.A., Clark, R.W., 2017. Avoiding the serpent's tooth: predator-prey interactions between free-ranging sidewinder rattlesnakes and desert kangaroo rats. *Animal Behaviour* 130: 73–78.

Week 5 (Distribution and abundance):

- a. Ratcliffe et al. 2009. The eradication of feral cats from Ascension Island and its subsequent recolonization by seabirds. *Oryx* 44:20-29.
- b. Karalius and Alpert. 2010. High abundance of introduced plants on ancient Native American middens. *Biological Invasions* 12: 1125-1132.

Week 6 (Population dynamics and growth):

- a. Daily, G.C. and P.R. Ehrlich 1992. Population, Sustainability, and Earth's Carrying Capacity. *BioScience* 42(10): 761-771.
- b. Myers, J. H. 2018. Population cycles: Generalities, exceptions and remaining mysteries. *Proceedings of the Royal Society B: Biological Sciences* 285: 20172841.

Week 7 (Competition, exploitation & mutualism):

- a. Smith, D.W., Peterson, R.O. and Houston, D.B. 2003. Yellowstone after Wolves. *Bioscience* 53(4): 330-340.
- b. Palmer et al. 2008. Breakdown of an Ant-Plant Mutualism Follows the Loss of Large Herbivores from an African Savanna. *Science* 319: 192-195.

Week 8 (Biodiversity):

- a. Springer et al. 2003. Sequential megafaunal collapse in the North Pacific Ocean: An ongoing legacy of industrial whaling? *Proceedings of the National Academy of Sciences of the USA* 100: 12223-12228.
- b. Traill, L.W., Brook, B.W., Frankham, R.R. and Bradshaw, C.J.A. 2010. Pragmatic population viability targets in a rapidly changing world. *Biological Conservation* 143: 28-34

Week 9 (Conservation):

- a. Titus, K. L., & Jachowski, D. S. 2021. Persistent negative stakeholder perspectives limit recovery of a critically endangered carnivore. *Conservation Science and Practice*, 3: e526
- b. Hebblewhite, M. 2017. Billion dollar boreal woodland caribou and the biodiversity impacts of the global oil and gas industry. *Biological Conservation* 206: 102–111.

Week 10 (Corridors, protected areas & habitat fragmentation):

- a. Helldin, J.O. (2022). Are several small wildlife crossing structures better than a single large? Arguments from the perspective of large wildlife conservation. *Nature Conservation* 47: 197–213.
- b. Tattersall, E.R., Burgar, J.M., Fisher, J.T. & Burton, A.C. (2020). Mammal seismic line use varies with restoration: Applying habitat restoration to species at risk conservation in a working landscape. *Biological Conservation* 241:108295.

Week 11 (Urbanization & Management):

- a. Schell, C.J., Dyson, K., Fuentes, T.L., Des Roches, S., Harris, N.C., Miller, D.S., Woelfle-Erskine, C.A. & Lambert, M.R. (2020). The ecological and evolutionary consequences of systemic racism in urban environments. *Science*, 369, eaay4497.
- b. Ranglack et al. 2015. Competition on the range: science vs. perception in a bison–cattle conflict in the western USA. *Journal of Applied Ecology* 52: 467–474.

Week 12 (Ecology and conservation of polar bears):

- a. Langwieder et al. 2023. Community-led non-invasive polar bear monitoring in the Eeyou Marine Region of James Bay, Canada: insights on distribution and body condition during the ice-free season. *FACETS* 8: 1-12.
- b. Harvey et al. 2018. Internet blogs, polar bears, and climate-change denial by proxy. *BioScience* 68: 281–287.

Important Course information

All students are expected to familiarize themselves with the following information, available on the [Senate Committee on Academic Standards, Curriculum & Pedagogy webpage](#)

- Senate Policy on Academic Honesty and the Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation
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