

GGR 305 H1S 2014 Biogeography

COURSE OUTLINE

Instructor: Dr. Nina Hewitt, nina.hewitt@utoronto.ca; Sidney Smith Hall 5038
Office hours: Thurs 5-6 pm; 8-9 pm, and *by appointment* Tues or Thurs afternoons

Lectures: Thursdays, 6:00-8:00 pm, SS 2127

TA: Maara Packalen, maara.packalen@mail.utoronto.ca

Course Description

Biogeography is the study of the distribution of plants and animals on the earth's surface, and the historical, ecological, and human factors responsible. Generally, it is concerned with fundamental processes of evolution, extinction, and dispersal. It asks such questions as: Why are placental mammals dominant in Eurasia and North America while marsupials dominate Australia? Why do Australia and Africa share the same plant families? Why are there so many insect, microbe, and plant species in the tropics and why do their numbers decrease towards the poles? What allows a plant species to live where it does, and what prevents its colonization elsewhere? How are plant and animal distributions today different from in the past, and what implications does this have for their abilities to respond to global changes? Why have islands sustained so many extinctions relative to mainlands and what are the implications for mainland species conservation? This course explores these and similar questions. The goal is to introduce the field of biogeography, understand biodiversity patterns and processes across earth, and how this knowledge can help maintain biological systems in human-dominated, 21st century landscapes. We will explore biogeographic themes through lecture, readings from texts and pivotal scholarly articles, classroom discussion, and research assignments.

Course Objectives

- ✓ Explaining patterns of species distributions in terms of physical, ecological and historical controls
- ✓ Understanding the role of processes that operate at geological and evolutionary time scales (e.g., plate tectonic effects, speciation, extinction) in the above
- ✓ Regional analysis of human impacts on species and landscapes from the Pleistocene to the modern era
- ✓ Hypotheses testing of biogeographical question (e.g., testing predictions of effects of ecosystem fragmentation on species populations; testing effects of reserve size on species richness)
- ✓ Basic data manipulation, graphical representation, interpretation and analysis
- ✓ Effective scientific report writing and critical analysis of scholarly literature

Required Text and Readings:

1. Cox, B. and Moore, (2010) *Biogeography: An ecological and evolutionary approach*. 8th Ed. Wiley, NJ (available in the U of T Bookstore).

2. Supplemental readings consist of a series of book chapters and journal articles which will be available through the course website on Blackboard. A schedule of most of these weekly readings with page numbers is provided below; others will be announced in lecture.

Readings and Lectures

Lecture notes will be posted on the course website. Note that these are simple outlines and do not substitute for class attendance (see below). Readings should either be done prior to or immediately following the class for which they are scheduled. Reading material is designed to challenge your knowledge and assumptions, as well as to inform you. You are expected to struggle through difficult aspects of the readings, although you are not expected to come to class an expert on those topics. Class meetings are there to assist you with difficult aspects of readings and address your questions. In many cases, the readings I have chosen are interesting and accessible (e.g., Gould, Quammen, Flannery are thoroughly enjoyable). Articles from academic journals and may be somewhat more challenging, but will enhance your academic experience and mastery of the subject matter.

Assignments

To further our understanding of biogeographical phenomena, you will complete 2 written Assignments. These will be research-related and pertain to course topics. Basic knowledge of Excel spreadsheets to examine and describe simple datasets is advantageous, but some instruction will be provided by the TA for those students who need assistance. Assignments must be handed in to the professor by the beginning of the class on the due date indicated. Assignments not submitted in class must be turned in via the Drop Box located outside of the Geography Main Office (Sidney Smith Hall 5047). You can only submit assignments to the Drop Box weekdays, during business hours, between 9am and 5pm sharp. Drop Box assignments will be time stamped as "5 pm submission" by the office staff at the end of the day, but to be safe, you should get your assignment there before 4:45pm. Late work will be assessed a penalty of 5% per day including weekends. Late work will not be accepted after the date it is handed back to the class. Please notify me if you are having difficulties with assignments so that I can help you early in the process. Additional information on the assignment format will be provided in class. (Pay careful attention to the format specified, as students who ignore it needlessly lose points!).

Attendance

It is important that you attend classes. Students that attend more classes have better understanding, get better grades and seem to enjoy course content better. I will routinely take attendance to keep track of who is present. Students are responsible for announcements or changes to the syllabus made while they are absent.

Tests

The midterm test will take place during class on Thursday, February __, and will consist of multiple choice, short answer and short discussion questions. The final exam will follow the same format and will be held during the exam period in April. It will cover lecture and reading material since the start of term, but will place emphasis on material after the midterm. Information from the textbook and other resources *not* directly covered in class or in the assignments will *not* be tested on exams. Additional details, including a list of study topics and tips, will be provided on Blackboard one week before the test/exam.

Do not miss tests. Accommodation will only be made in the case of a *serious* documented emergency. In the unusual event of such an emergency the student must immediately notify the professor by email or in person PRIOR to the scheduled test. Once proper documentation has been provided, the professor will determine whether to allow the student to write a makeup test. For documentation of a medical emergency, please use the official U of T medical certificate available online at <http://www.healthservice.utoronto.ca/pdfs/medcert.htm>. In the event of *serious* non-medical extenuating circumstances, students should also notify the professor in advance and provide supporting documentation from their college registrar's office. Students should note that makeup tests are more challenging than regularly scheduled tests, to be fair to students who wrote the test on time.

Accessibility and Academic Honesty

The University of Toronto is committed to accessibility. If you require accommodations or have any accessibility concerns, please visit <http://studentlife.utoronto.ca/accessibility> or contact disability.services@utoronto.ca

The rules of academic honesty must be strictly observed in this course. Plagiarism is quoting or paraphrasing the work of an author, including that of fellow students, without proper citation. It is *never* the case that students are exempt from acknowledging where ideas come from in their written work. This is true whether the student is submitting a formal paper or a hand-written summary. Students should not be submitting any academic work for which credit has previously been obtained or is being sought, without the consent of the instructor. Please consult the rules section of the Arts and Science Calendar:

http://www.artsandscience.utoronto.ca/ofr/calendar/Rules_&Regulations.html

For further information and check www.artsci.utoronto.ca/osai/students and the 'How not to plagiarize' website at: <http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize>

Evaluation

Assignment 1	15 % (due Feb 6, at the beginning of class)
Assignment 2	20 % (due Mar 20, at the beginning of class)
Term Test	25 % (Feb 13, in class)
Final Exam (cumulative)	40 %

Class Schedule

Lectures

Date	Topic	Readings
Jan 9	Introduction: Historical vs Ecological Biogeography Physical Setting; Intro to Biomes	CM Ch 2 and 3 pp. 37-70; 78-87 (skim)
16	Historical Biogeography 1: Evolution, Speciation;	CM Ch 1 and 6 Gould (e - skim)
23	Islands: Evolution, Immigration and Extinction	CM Ch 8, Krause 2010, Quammen (j) MacDonald pp. 228-234
30	Historical Biogeography 2: Plate Tectonic Effects	CM Ch 5, Flannery (c)
Feb 6	Development of Flora and Fauna today (A1 due) Great American Exchange	CM Ch 11, Gould (h), Marshall (j)
13	Midterm Test - See: study topics on Course Website	
20	Break. No Class	
27	Intro to A2; Quaternary Environments and Vegetation Emergence of Humans; Megafauna Extinctions	CM Ch 12, Pielou (n), Davis & Shaw (d) CM Ch 13, Flannery (d), Barnofsky (a)
Mar 6	Ecological Biogeography: Rarity and Extinction	Quammen (k)
13	Biodiversity Patterns: Hotspots and Coldspots	CM Ch 4, Kariyeva 2003, Myers 2000
20	Ecosystem Fragmentation (A2 due)	CM Ch 14, Ch 2, pp. 71-78, Hewitt (g)
27	Climate Change Science and Policy; Assisted Migration	IPCC (skim), Hewitt et al. 2011 (skim)
Apr 3	Invasive Species and Climate Change	Smith et al. 2012 (l)

Keep in Mind That:

I reserve the right to alter the schedule of topics and readings. Changes will be announced in class and students are responsible for keeping abreast of any and all changes, including announcements made while the student was absent or tardy. Students agree to accept and comply with these requirements by choosing to remain enrolled in the course.

Additional Readings:

- Barnofsky *et al.* (2004) Assessing the Causes of Late Pleistocene Extinctions on the Continents. *Science* 306: 70-75.
- Davis, M. B. and R. G. Shaw (2001). "Range shifts and adaptive responses to quaternary climate change." *Science* 292: 673-679.
- Flannery, T. (1991). *The Future Eaters*. Braziller, Melbourne Australia. pp. 75-101 (Australian Geological history and its flora and fauna; resource poverty and high diversity)
- Ibid.* pp. 137-43; 180-207 (Emergence of an Extinction Species: Human Origins and Megafaunal Extinctions).
- Gould, S.J. (1980) Ch 17. The Episodic Nature of Evolutionary Change. In *The Panda's Thumb*.
- Ibid.* Ch 28: Sticking up for Marsupials.
- Hewitt, N. (2009) Forest Fragmentation. In, B. Warf (ed.) *Encyclopedia of Geography*. Sage Publ. (in press).
- Marshall, L.G. 1988. Land Mammals and the Great American Interchange. *American Scientist* 76: 380-388
- Pielou, E.C. (1992) pp. 90-102. *After the Ice Age*, U. Chicago Press, Chicago.
- Quammen, D. (1996) *The Song of the Dodo: Island Biogeography in an Age of Extinctions*. Touchstone. Pp. 75-80; 413-31; 436-441; 457-463; 478-485. (Island Biogeography, Dan Simberloff; tropical forest fragments and Saki monkeys).
- Quammen, D. (1996) *Ibid.* Pp. 262-75; 289-96; 380-1. (Rarity, island species, extinction)
- Smith, A.L. Hewitt, N. Klenk, N. Bazely, D.R. Yan, N., Wood, S., Henriques, I., MacLellan, J.I., Lipsig-Mumme, C. 2012. Effects of climate change on the distribution of invasive alien species in Canada: a knowledge synthesis of range change projections in a warming world. *Environmental Reviews* 20:1-16.