

Biogeography

BIOL/GEOG 3500

Winter, 2019

Lectures Tuesdays at 12:30 to 14:30 – Location: **RN 203**

Labs Section 1: Friday 12:30 to 14:30 – Location: BC 214
Section 2: Friday 14:30 to 16:30 – Location: ACE 008
Section 3: Tuesday 14:30 to 16:30 – Location: VH 1016
Section 4: Friday 10:30 to 12:30 – Location: VH 1020
** It is critical that you attend your assigned lab section**

Instructor

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Teaching Assistants

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Course Description

In the broadest sense, biogeography is the study of the distribution of organisms (also biomes, ecosystems, etc.) through space and time. The field of biogeography draws on a wide range of scientific disciplines, including ecology, evolutionary biology, genetics, taxonomy, geology, paleoecology, and climatology. Ecological biogeography emphasizes processes occurring over short temporal and often limited spatial scales, while historical biogeography is concerned with processes taking place over thousands to millions of years on a global scale. The aim of this course is to provide students with an understanding of the ecological and evolutionary factors that control the distribution of organisms in the modern landscape and over geologic time, as well as an appreciation of the wide range of topics currently being studied by biogeographers. Students will learn about research and hypothesis testing in biogeography through lab exercises, culminating in an independent project where they will develop critical skills in biogeographic sampling design, data collection, analysis of primary data, and dissemination of research results.

Course Objectives

The aim of this course is to provide students with a thorough understanding of the exciting field of biogeography. By the end of the course students will:

1. Understand the complex interactions between ecological and evolutionary factors that control the distribution of organisms in the modern landscape.
2. Identify how evolutionary and climatic factors have shaped the distribution of organisms over geologic time, and led to the modern distribution of biota.
3. Gain an appreciation of the wide range of topics studied by biogeographers.
4. Develop critical research skills in the design of biogeographic sampling, analyses of primary data and dissemination of research results.
5. Be able to place the basic principles of biogeography in the context of the rapidly changing environment we find ourselves in.

Course Materials

Textbook:

Required: Cox CB, Moore PD, and Ladle R. *Biogeography: An Ecological and Evolutionary Approach*. 9th Edition. John Wiley and Sons, Inc.

ISBN 9781118968581 [paperback]

Available at the campus bookstore

Course website:

GEOG3500 will have an active Moodle environment that will be your primary hub for all information related to the course. Please check Moodle regularly for the most up to date course information and news.

Tentative Schedule and Topics for the Course

(Subject to modification)

Lectures:

Date	Lecture Topic	Textbook Readings
January 8	Introduction and History of Biogeography	Chapter 1
January 15	A Brief History of Life on Earth	Chapters 5, 11, 12 (selected sections)
January 22	Evolution and Speciation	Chapter 6
January 29	Dispersal	Chapter 2
February 5	Ecological Niches	Chapter 3
February 12	Extinction	Chapters 7, 9
February 19	Reading week	
February 26	MIDTERM	
March 5	Islands Biogeography	Chapter 7
March 12	Disturbance	Chapter 8
March 19	Biodiversity	Chapter 4
March 26	Conservation Biogeography	Chapter 14
April 2	Global Environmental Change	Chapter 13
April, TBD	FINAL EXAM	

Labs:

Week	Dates	
1	Jan 1, 4	No lab
2	Jan 8, 11	Intro to the labs – research methods and your major project
3	Jan 15, 18	Formulating a research proposal
4	Jan 22, 25	Peer and instructor feedback on your proposals
5	Jan 29, Feb 1	Student presentations: Research Methods Assignment
6	Feb 5, 8	Student presentations: Research Methods Assignment
7	Feb 12, 15	Student presentations: Research Methods Assignment
	Feb 19, 22	Reading week
8	Feb 26, Mar 1	Data analysis
9	Mar 5, 8	Invasive species speed dating
10	Mar 12, 15	Island biogeography part 1
11	Mar 19, 22	Island biogeography part 2 DUE: Independent Research Project
12	Mar 26, 29	No lab

Examinations

There will be a mid-term examination on **February 26, 2019**, covering class and textbook material presented prior to the reading week break. All of the material covered in the textbook is considered testable, even if it is not covered specifically in lecture. The midterm exam will account for 20% of your mark.

The final exam for the class will occur in the university's scheduled exam period in April, which runs from **April 5 – 20, 2019**. The final exam for the course will be cumulative in nature, covering all of the material and textbook readings throughout the term. Approximately 15% of the exam will be based on material from prior to the midterm. Many topics presented in the second half of the course will build upon the principles learned in the first half of the class. The final exam will account for 25% of your mark.

Assignments

Independent Research Project

For your major assignment, you will design and carry out an original research project in biogeography. This assignment will be carried out over several weeks of class as a semi-directed, group project. As part of a group, you will design a biogeographic experiment and formulate a testable hypothesis, carry out the data collection and statistical analyses, and then independently write up your findings in the form of a scientific manuscript. The formal manuscript will be due at the start of the final lab, on **March 19 or 22** (depending on your lab section). This assignment is worth 30% of your final mark. You will write a research proposal (as a group), with feedback from your peers and TA. The proposal is due at the beginning of Lab Week 5, and is worth 10%.

Research Methods Assignment

You will choose an article published within the last 5 years (since 2013) in one of the *Journal of Biogeography*, *Ecography*, or *Global Ecology and Biogeography*. You will prepare a 10-minute presentation summarizing the study objectives and/or research questions, the methods used to address the study objectives, the main findings of the paper, and the broader significance of the findings to the field of biogeography. Dates for your presentation, in one of labs 5-7, will be drawn randomly in the first class. This assignment is worth 15% of your final grade.

Island Biogeography Lab Assignment

Working in groups over two lab periods you will simulate species invasions and extinctions on islands. In the second slot of the islands biogeography lab you will compare data across different groups, and answer a series of questions related to the principles of the equilibrium theory of island biogeography. Participation in, and completion of the questions associated with the lab, are worth 5% of your final grade.

Invasive Species Speed Dating Assignment

The week before the invasive species speed dating lab you will choose a taxon to research. You will be required to produce a 1-2 page (typed, single spaced) summary of this species, including information on its ecology in its native and invaded ranges. You will then learn about other classmates' species in a series of rapid-fire exchanges. You will hand in your summary during lab, which will be worth 5% of your final grade.

Marks Breakdown Summary

Midterm	20%
Final Exam	25%
Independent Project – Plant Biogeography Study	30%
Island Biogeography Lab	5%
Research Methods Assignment	15%
Invasive Species Lab	<u>5%</u>
	100%

Grades

90%-100: A+	60-64: C
80-89: A	55-59: D+
75-79: B+	50-54: D
70-74: B	40-49: E
65-69: C+	0-39: F

Course and University Policies

Late assignments:

Late assignments will receive a deduction of **10% per day**, unless a doctor's note is provided. Requests for extension, accompanied by appropriate documentation, must be made via email to the course director prior to the due date of the assignment. Teaching assistants will not grant extensions.

Missed exams:

It is the student's responsibility to be available to take examinations in the scheduled times. Formal requests for deferred examinations must be accompanied by the appropriate paperwork and documentation. Missed midterm examinations must be written at the earliest mutually convenient date. Students missing the midterm will also have the option of writing a final exam worth 45%.

Plagiarism:

The University policy on academic honesty and plagiarism can be found at the following link, which I expect you to review.

<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>

As well, please see the online tutorial at: <https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/>

Resources

Counseling and Disability Services

N110 Bennett Centre for Student Services

416-736-5297

<http://cds.info.yorku.ca/>

-York provides psychological and academic support services to all students, including personal counselling, crisis response and support, assistance in the development of learning skills, and specialized support for students with learning disabilities

Geographic Resource Centre (GRC)

S403 Ross Building

- The GRC is a quiet research and study facility for students in the Dept. of Geography. Computers are available for student use, including internet access, access to digital course material, and MS Office software. Various Biogeography textbooks are also available should students want to supplement their learning in the course.

Social Media

The Department of Geography at York University maintains an active social media presence to communicate with students:

Facebook: <https://www.facebook.com/YorkUGeography/>

Twitter: <https://twitter.com/YorkGeography>