

Geography 323: Biogeography, Summer 2018 (CRN 40923)

Class meets:

10:00 – 12:50 pm Monday-Thursday in
106 Condon Hall from June 25 to July 22

Instructor: Erin Herring (eherring@uoregon.edu)

Office Hours: Tuesdays from 9-9:50 am in 217 Pacific,
or by appointment

Biogeography, once a secret delicacy enjoyed only by geniuses, must now be elevated from its current obscurity and placed alongside literature and history as an indispensable component of a truly enlightened education. —Dennis McCarthy, Here Be Dragons.

Course Overview: The spatial patterns of species distributions are widely recognized, but few appreciate the complex causes of these patterns. Biogeography is the study of the spatial patterns of biological diversity, and its causes, both in the present and in the past. Biogeographers synthesize information from a very broad range of fields, including ecology, evolution, paleontology, and climatology. This course will provide the ecological and historical foundations for understanding the distribution and abundance of species, and the changes in distribution and abundance over time. We will also explore the relevance of biogeography during a time of increasing human impact and climate change.



Prerequisite: GEOG 141, GEOL 103, GEOL 203 or BI 370.

The course begins with an overview of important concepts, including evolutionary mechanisms, earth history, and plate tectonics, as well as concepts of the ecological niche and patterns of distribution at various taxonomic levels. We also study basic ecological concepts, how species are patterned and disperse on the landscape, and how these patterns have changed over the relatively recent ice ages. In the second part of the course, we delve into historical biogeography and study why continents and islands have unique assemblages of species, and the effects of megaextinctions and biotic interchanges between continents. We also return to ecological concepts in a detailed examination of the equilibrium theory of island biogeography. The following diagram illustrates the organization of topics to be covered, with the emphasis on how this information is used to understand current biodiversity and what threatens it.

Goals of the course:

- To develop an appreciation for the historical and ecological factors that influence the pattern of life on earth.

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- To survey the scientific revolutions of evolution, plate tectonics, and molecular ecology that shaped the path to modern biogeography.
- Using the lab assignments, to apply the information covered in lecture to a real world scenario.
- To understand the processes that affect how biotas respond to a changing climate, and the challenges we face today and in years to come.

Course format: This is an intensive four-week course. Our class time will be at least 60% lecture, with the remainder spent on in-class activities and labs. Labs will require additional time outside of class to complete. Course readings including labs should be completed **BEFORE** the class for which they are assigned.

Reading materials:

- All readings will be supplied online through Canvas.
 - You may wish to purchase the following book (no longer in print) if you can get a copy through Amazon or another seller: Here Be Dragons, by Dennis McCarthy. Oxford University Press. This book is no longer in print, but I suggest finding a used copy via Amazon or some other source. There is a kindle edition available from Amazon for \$9.99.
- All labs and any additional materials will be posted on Canvas in the Files Folder.

Evaluation: Final grades will be assessed as:

- **Three take home exams - 10% each (30% of total grade):**
 - All of these exams will be taken on Canvas and under the “quizzes” tab. The goal of these exams is not to test if you can memorize facts, but to see how well you can take the concepts discussed in class and apply them to the real world.
 - A discussion board will be set up on Canvas before the start of each exam. You can post questions on this board and other students and I will respond.
 - Questions will be a combination of short answer (a sentence or two) and essay (paragraph, ≥5 sentences). If you feel that a picture/drawing should be included in the answer, you will have the option to upload a picture or two to answer a question.
 - All exams will be made available on Thursday, after class, and you will have until 11:59 pm on Saturday to complete it.
- **Three lab assignments - 10% each (30% of total grade):**
 - All these labs will be have two parts (data collection and data analysis).
 - We will discuss and start the labs in class, and then you will need to complete the labs on your own time.
 - All labs should be typed and submitted on Canvas before class on the day that they are due.
- **Homework assignments - 10%**
 - There several homework assignments that are due throughout the term. Most will be directly related to your Research Project and may be discussed in class the following class meeting. All homework should be submitted on Canvas before class on the day that they are due.
- **Participation - 5%:**
 - Contributing to discussions during class.

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- Participating in lab activities.
- **Research Project - 25%:**
 - Each student will provide a detailed discussion on a topic relating to biogeography. See separate handout for more details on this project.
 - The presentation of the research project will take place on the last two days of class. The presentation should be approximately 10-15 mins in length. – 15% of total grade.
 - A detailed outline with all sources (references) cited will also be required for this project. – 5% of total grade
 - Each student will provide feedback to the presenters using an evaluation form. - 5% of total grade

*******No makeup exams will be offered unless you arrange this with me in advance. No makeups will be offered for in-class activities or labs. Homework and labs will be assessed a 10% per day penalty if they are late.*******

Attendance is mandatory for both lecture and labs. You are responsible for all material covered in lab and lecture. Because of the intensive nature of summer classes, missing even one day of class will put you behind. I will only describe the lab assignments once. If you do have to miss a day for a legitimate reason, talk to me in advance. You will not pass this class if you skip lectures and lab.

Academic Misconduct: The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at researchguides.uoregon.edu/citing-plagiarism.

Disability Services Notice: I work hard to ensure a quality learning experience for all students. If you need specific accommodations to get the most out of this class, please let me know by (1) informing me of your particular needs, and (2) providing the appropriate documentation from the campus learning services office. I will make every effort to accommodate your needs, but you must notify me by the first week of class if you need special arrangements.

Note: I consider this syllabus a contract between myself and the students in this course. In writing this syllabus, I have obligated myself to follow the policies and procedures contained herein. You are responsible for understanding and following these policies as well. I reserve the right to make changes to this syllabus. You will receive verbal and written notification of major changes to course policies, procedures and content.

Link to other useful resources for topics in Biogeography:
http://geog.uoregon.edu/gavin/courses/Geog323/Geog323_links.html

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Class Schedule

| Date | Class | Topic | Required Readings | Assignments |
|---------|-------|---|--|---|
| June 25 | 1 | Introduction and history of biogeography | McCarthy Chapter 1 MacDonald , pages 1-16 | |
| June 26 | 2 | Evolution and plate tectonics | McCarthy Chapter 2 MacDonald Chapter 9 Evolution 101 web pages | Start Lab 1 |
| June 27 | 3 | Introduction to dispersal: Excerpt from Darwin's 'Origin of Species' | Darwin Ch. 12 ("means of dispersal") McCarthy Chapter 3 | HW 1 due |
| June 28 | 4 | Ecological niche and distributions of species | Gavin Lomolino et al. 84-113 Pielou Chapter 13 Lomolino et al. pp. 167-204 (Chapter 6) | <i>Exam 1</i> |
| July 2 | 5 | Ecoregions and Biomes | | Lab 1 due Start Lab 2 |
| July 3 | 6 | Dispersal syndromes and biodiversity | Molles pp. 197-203 Perry Chapter 10 | HW 2 due |
| July 4 | | *****NO CLASS***** | | |
| July 5 | 7 | Pleistocene climate, Pleistocene biogeography, and paleoecology | Jackson . Quaternary Biogeography | <i>Exam 2</i> |
| July 9 | 8 | Life, death, and evolution on islands | Cox et al : Chapter 7 | |
| July 10 | 9 | The Theory of Island Biogeography | MacDonald 428-444 Website : I.B. explained | HW 3 due Start Lab 3 |
| July 11 | 10 | Phylogenetics, Vicariance, the Great American Interchange and Amazon biodiversity | Cox et al. Chapter 8 Zimmer and Emian McCarthy Chapter 5 | Lab 2 due <i>Exam 3</i> |
| July 12 | 11 | Research Project Conferences | | |
| July 16 | 12 | Advent of Humanity and Pleistocene Megafauna Extinctions | Flannery 186-217 McCarthy Chapter 7 (Advent of humanity) | |
| July 17 | 13 | Conservation Biogeography, Mega-extinctions and Climate Change | Cox et al. Chapter 14 (first 36 pages) Online only : Jablonski <i>McCarthy</i> Chapter 8 (just skim...) | Lab 3 due |
| July 18 | 14 | PRESENTATIONS | | |
| July 19 | 15 | PRESENTATIONS | | Presentation Outline due by 5 pm |
| July 20 | | | | Presentation evaluations due by 5 pm |