

## BIOGEOGRAPHY - BIOL 5010/6010 - SPRING 2020

*'The study of the distribution of species and ecosystems in geographic space and through geological time'*

MWF 10:30-11:20 pm, LSB 207

### Professors:

Dr. James Pitts; Office - GEOLOGY 301; james.pitts@usu.edu. Office hours – W 3:30-4:30 pm, or by appointment

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### Why study Biogeography?

Biogeography is an integrative field of science that combines concepts and information from evolutionary biology, ecology, geology, and physical geography. Modern biogeographic research unifies information and ideas from the physiological and ecological constraints on organismal distribution, to geological and climatological processes operating at global spatial scales and evolutionary time frames. Thus, biogeography attempts to explain the patterns of species distribution across geographical areas through a combination of historical factors, such as speciation, extinction, glaciation, and continental drift, as well as ecological factors. In the present era of human-caused alteration of landscapes and climate change, an understanding of biogeography is critical to predicting future landscapes and the fate of resident species, including humans. This course will focus on historical biogeography.

| Essential Learning Objectives (IDEA Center)  | Course Objectives & Outcomes  |
|--|---|
| Gaining factual knowledge (terminology, classifications, methods, trends)                        | You will learn and recall basic biological facts, vocabulary, and history important for studying biogeography   |
| Learning fundamental principles, generalizations, or theories                                    | You will understand the biological and geological processes determining the distribution of organisms currently and historically; you will learn evolutionary concepts and comprehend the unifying role of evolution in all biology |
| Learning to apply course materials (to improve rational thinking, problem solving and decisions) | You will be able to use scientific reasoning skills, such as when we engage in class discussions, to understand both biogeography and evolution as a science  |

**Course Format** – Each week will typically consist of two lecture periods (Monday and Wednesday), and a group discussion on Fridays, in which we analyze and discuss a paper or papers from the primary literature. Outside of class, you will read the textbook and the articles we assign, and take online quizzes to assist learning and prepare you to understand the concepts we cover in class. For Friday discussion classes, you will submit three questions or reflections based on the reading, which will form the basis for class discussions. You will submit these on Canvas and they will be counted as part of your participation grade.

**Course Resources**

**Canvas:** You will use our Canvas site to receive important course announcements, download class materials, take quizzes and exams, and view grades. ***Sign up for push notifications of announcements as soon as possible.***

**Textbook (required): Lomolino & Riddle. 2016. *Biogeography*, 5th Ed., Sinauer Assoc. ISBN 9781605354729. At USU Bookstore; Amazon.com.**

**Assignments:**

- **Textbook chapters:** You will have reading assignments to learn basic facts and concepts, so that we can explore concepts, questions, and scientific analyses more deeply during class time.
- **Articles for discussion:** In most weeks, we will assign an article or articles mostly from the primary literature, to be discussed during the Friday class. Before class, you will submit three questions or topics for discussion.
- **Participation:** Will be divided into two parts.
  - **Three Questions:** For Friday discussion classes, you will submit three questions or reflections based on the reading, which will form the basis for class discussions. ***These questions will be 5%.*** You will submit these on Canvas and they will count as part of your participation grade. The questions should pertain to topics that you think should be discussed; if there are sections, statements, topics, etc. in the readings that you do not understand, you are expected to **expend some effort** prior to the discussion on Fridays trying to understand them.
  - **Participation in Discussion:** The remainder of the participation points (***5% for graduate students and 10% for undergraduates***) will be determined by actual participation during Friday's discussion. *If you do not participate (i.e. speak, thus showing that you have read and have some understanding of the topic), you will receive ZERO (0) points for that discussion. It will be considered all or nothing for that day.*
- **Quizzes:** Outside of class you will take an online quiz every week in Canvas on the chapter reading and lectures for that week. The quiz is **open book** and ***due by 10:30 am*** on Fridays and will cover information concerning that week's lectures, the textbook chapter associated with that week's lectures, and that week's Friday reading(s). This is to ensure that you have the salient points, as well as the background information to get the most out of class and Friday's discussion.
- **Exams:** The quizzes and articles will help you prepare for exams, and, although the exams will emphasize what we cover in class, some questions will be gleaned from the textbook and readings. You will use both simple fact recall and higher-level scientific reasoning skills on exams. You will take exams during the regular class time, 10:30-11:20 pm. ***Exams are closed-book and on your own.*** *Absences demanded by university-related activities, travel for interviews, for medical and family emergencies can be accommodated, given documentation & advance notice.*
- **Graduate Students:** You will each be responsible for preparing and delivering a lecture on a biogeographical topic of your interest.

**Undergraduate Grading:** Your grade will be weighted as follows:

|                        |     |
|------------------------|-----|
| Quizzes                | 15% |
| Exams (2 @ 20%)        | 40% |
| In-class participation | 15% |
| Final Exam             | 30% |

**Graduate Grading:** Your grade will be weighted as follows:

|                        |     |
|------------------------|-----|
| Quizzes                | 10% |
| Exams (2 @ 20%)        | 40% |
| In-class participation | 10% |
| Lecture                | 10% |
| Final Exam             | 30% |

Grade assignments are according to the USU standard: A (93-100%), A- (90-92.9%), B+ (87-89.9%), B (83-86.9%), B- (80-82.9%), C+ (77-79.9%), C (73-76.9%), C- (70-72.9%), D+ (67-69.9%), D (60-66.9%), and F (below 60%).

**University Policies**

**The Honor System & Plagiarism:** [www.usu.edu/studentservices/studentcode/article6.cfm](http://www.usu.edu/studentservices/studentcode/article6.cfm). To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: ***“I pledge, on my honor, to conduct myself with the foremost level of academic integrity.”*** Students have a responsibility to promote academic integrity at the University by not participating in or facilitating others' participation in any act of academic dishonesty and by reporting all violations or suspected violations of the Academic Integrity Standard to their instructors. Violations of the Academic Integrity Standard (academic violations) include but are not limited to: cheating, falsification, plagiarism.

**ADA compliance:** <http://catalog.usu.edu/content.php?catoid=12&navoid=3168>

**Important Dates (drop/add etc.):** <http://catalog.usu.edu/content.php?catoid=12&navoid=7345>

**Incompletes:** USU policy applies; <http://catalog.usu.edu/content.php?catoid=12&navoid=3583>

| <b>Date</b>     | <b>Topic</b>  | <b>L &amp; R Chapter</b> |
|-----------------|---|--------------------------|
| M Jan 6         | <b>Introduction &amp; Lecture - The Science of Biogeography</b>   | 1                        |
| W Jan 8         | <b>The Science of Biogeography</b>  | 1                        |
| F Jan 10        | <b>The History and Reticulating Phylogeny of Biogeography</b>   | 2 (quiz 1)               |
| <b>M Jan 13</b> | (continued)   | 2                        |
| W Jan 15        | <b>The Geographic Template: Visualization and Analysis of Biogeographic Patterns</b>  | 3                        |
| F Jan 17        | Discussion  | (quiz 2)                 |
| M Jan 20        | <i>Labor Day Holiday – no class</i>   |                          |
| W Jan 22        | <b>Ecology:</b> Distributions of Species: Ecological Foundations & Distribution and Dynamics of Communities, Biomes, and Ecosystems | 4,5                      |
| F Jan 24        | Discussion  | (quiz 3)                 |
| M Jan 27        | <b>Dispersal and Immigration</b>  | 6                        |
| W Jan 29        | (continued)   | 6                        |
| F Jan 31        | Discussion  | (quiz 4)                 |
| M Feb 3         | <b>Speciation and Extinction</b>  | 7                        |
| W Feb 5         | (continued)   | 7                        |
| F Feb 7         | <b>EXAM I</b>   |                          |
| M Feb 10        | <b>The Changing Earth</b>   | 8                        |
| W Feb 12        | (continued)   | 8                        |
| F Feb 14        | Discussion  | (quiz 5)                 |
| M Feb 17        | President's Day   |                          |
| W Feb 19        | <b>Glaciation and Biogeographic Dynamics of the Pleistocene</b>   | 9                        |
| F Feb 21        | Discussion  | (quiz 6)                 |
| M Feb 24        | (continued)   | 9                        |
| W Feb 26        | (continued)   | 9                        |
| F Feb 28        | Discussion  | (quiz 7)                 |
| <b>Mar 2-6</b>  | <b>Spring Break</b>   |                          |
| M Mar 9         | <b>Island Biogeography</b>  | 13                       |
| W Mar 11        | (continued)   | 13                       |

|          |   |           |
|----------|---|-----------|
| F Mar 13 | Discussion  | (quiz 8)  |
| M Mar 16 | <b>The Geography of Diversification and Regionalization</b>         | 10        |
| W Mar 18 | (continued)   | 10        |
| F Mar 20 | <b>EXAM II</b>  |           |
| M Mar 23 | <b>Reconstructing the Evolutionary History of Lineages</b>          | 11        |
| W Mar 25 | (continued)   | 11        |
| F Mar 27 | Discussion  | (quiz 9)  |
| M Mar 30 | (continued)   | 11        |
| W Apr 1  | (continued)   | 11        |
| F Apr 3  | Discussion  | (quiz 10) |
| M Apr 6  | <b>Reconstructing the Geographic History of Lineages and Biotas</b> | 12        |
| W Apr 8  | (continued)   | 12        |
| F Apr 10 | <b>Discussion</b>   | (quiz 11) |
| M Apr 13 | (continued)   | 12        |
| W Apr 15 | (continued)   | 12        |
| F Apr 17 | <b>Discussion</b>   | (quiz 12) |
| M Apr 20 | <b>Graduate Presentations</b>                                       |           |
| F Apr 24 | <b>Final Exam 9:30 – 11:20</b>                                      |           |