

## **BIO 5301 – Biogeography**

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**Instructor:** Dr. Dan H. Foley III  
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Office Hours: Monday – Thursday 10:00am – 12:00noon (Del Rio)  
Friday by appointment

**Required Text:** Lomolino, M.V., B.R. Riddle, R.J. Whittaker and J.H. 2017. *Biogeography: Biological Diversity Across Space & Time*, 5<sup>th</sup> edition. Sinauer Associates.

We will also read and discuss papers that I will draw from the literature.

### **Course Description:**

Biogeography is the study of the present and past distribution of biodiversity. It is inherently multidisciplinary, integrating data and approaches across many fields within the physical and natural sciences. In this course, you will learn about the abiotic (geological and climatological) and biotic (ecological and evolutionary) factors that govern the assembly of species diversity across space and through time. Understanding these biogeographic principles is central for studies of biodiversity, global change, and conservation in today's rapidly changing world. The course format will consist of lecture, discussion, and computer-based activities.

### **Student learning Outcomes:**

By the end of the course the students should be able to:

1. Relate biogeographic distributions of plants and animals to abiotic and biotic drivers across spatial and temporal scales
2. Discriminate among hypotheses regarding dispersal, vicariance, endemism, and provincialism
3. Discuss the nature of insular faunas with respect to immigration, extinction, area, and evolutionary history
4. Apply biogeographic principles to conservation
5. Manipulate and visualize data in Excel using biogeographical methods and analytical techniques

My goal is to facilitate your learning of Biogeography. To do so I may combine lecture, computer-based activities, and discussions to expose you to the diverse questions and techniques that define biogeography. Learning is not a passive process. You are expected to:

- (1) Attend all class sessions
- (2) Actively participate by asking questions in class/office hours
- (3) Come prepared - read assignments prior to class
- (4) Communicate and work cooperatively and respectfully with your peers.

Slides from class lectures will be posted to the course blackboard. Slides often have a limited amount of text and I do not post my lecture notes. I therefore suggest you take notes during class and review your notes and the lecture slides after class.

### Discussion & Exercises

Our discussions and any computer-based exercises will reinforce and expand on key concepts introduced during lecture. These sessions are intended to provide you with the opportunity to think critically, to formulate questions and explanations, and to communicate these effectively to your peers.

### Communication

I encourage you to attend my office hours or e-mail me if you have any questions or have problems with the course. I cannot guarantee that I will be able to answer e-mails the night before an exam. I will post readings, updates, and other important documents to the course website. If you are unable to access these documents, please let me know. You are responsible for accessing and reading the assigned documents.

### Grading

Your final course grade will be calculated based on a midterm exam (15%), final exam (20%), 2 research reports (25% each) and 3 critique papers with subsequent discussion (5% each). The midterm and final will be a combination of short answer/essay questions and will test your knowledge on a variety of topics as well as critical thinking.

Exam questions will be based on lectures, readings, and the concepts covered in any computer-based activities. Exams will primarily include short-answer questions and when appropriate will assess your ability to interpret graphs. The final exam will not be explicitly comprehensive; however, given that course material is strongly interrelated, you may make use of the knowledge acquired throughout the course to adequately answer questions for the final. The best study guide for the exams will be your own class notes. It is my general policy to not offer make-up exams. If an emergency (serious illness of family member) arises and you miss an exam, it is your responsibility to contact me regarding the possibility of a make-up; these will be addressed on a case-by-case basis.

### Research Reports

- Report 1 - Give a 15 minute report and a 6 page paper on the descriptive and historical biogeography of a family-sized clade.
- Report 2 - Give a 15 minute report and a 6 page paper attempting to evaluate the modes of important biogeographic processes for this same clade, processes such as speciation, extinction and dispersal.

The idea of the two reports is to encourage each student to become an expert in a chosen family and to teach the rest of us what they have learned. If multiple students want to work on the same group, we will need to find a way to deal with that. Some families of animals (Muridae) and plants (Asteraceae, Fabaceae) are too large to do in a semester course. A subfamily or tribe would be a more manageable size. Peer-reviewed articles do not include newspaper, internet, popular magazine articles or government publications. Sources for peer-reviewed articles can be found at SRSU's Bryan Wildenthal Memorial Library, on the Web of Science or Google Scholar. Late projects will not be accepted.

### Critiques

There will be 3 critiques of journal articles throughout the semester which will add to class discussions and may appear on the exams. Critiques should summarize the context, methods, primary results, and ecological importance of the paper, and include your critical evaluation of the study. Length should not exceed 3 pages, double-spaced. All Critiques are due at the beginning of class on the due date. Late critiques will not be accepted.

### Critique Guidelines:

1. Include the paper's citation at the top of the page
2. You should outline the importance of the study (presented in the introduction), but focus most of your attention on the methods and results. What was the experimental design? Statistical methods? What is the overall importance of their findings? Why do we care?
3. Be skeptical. Do you think their methods were sound? Or are their conclusions acceptable? BUT, no study is perfect, so be fair with your assessment.
4. Take your time. Reading scientific papers is difficult, so slow down and enjoy learning something new!

### Assignments

There may be a few short assignments based on in-class activities. All assignments are due at the end of class unless otherwise indicated and late assignments will not be accepted.

### **BIO 5301: Biogeography**

#### Tentative Lecture Schedule

(note: exact date are subject to change, be sure to keep abreast of changes).

| <b>Week</b>   | <b>Topic</b>  | <b>Reading(s)</b> |
|---|---|-------------------|
| <b>Introduction &amp; The Geographic &amp; Ecological foundations of Biogeography</b> |   |                   |
| 1 – Jan. 17-20  | The Science of Biogeography   | Chapter 1         |
| 2 – Jan. 23-27  | The History & Reticulating Phylogeny of Biogeography<br><b>Critique 1</b> | Chapter 2         |
| 3 – Jan. 30 – Feb. 3  | The Geographic Template   | Chapter 3         |
| 4 – Feb. 6-10   | Distribution of Species<br><b>Critique 2</b>                              | Chapter 4         |
| 5 – Feb. 13-17  | The Distribution & Dynamics of Communities, Biomes & Ecosystems           | Chapter 5         |
| <b>Fundamental Biogeographic Processes &amp; Earth History</b>                        |   |                   |
| 6 – Feb. 20-24  | Dispersal & Immigration<br><b>Critique 3</b>                              | Chapter 6         |
| 7- Feb. 27-Mar. 3   | Speciation & Extinction   | Chapter 7         |
| 8 – Mar.6-10  | The Changing Earth<br><b>Midterm Exam</b>                                 | Chapter 8         |
| 9 – Mar. 13-17  | <i>Spring Break – No Classes</i>  |                   |
| 10 – Mar. 20-24   | Glaciation & Biogeographic Dynamics of the Pleistocene                    | Chapter 9         |

| <b>Evolutionary History of Lineages &amp; Biotas</b> |   |            |
|--|---|------------|
| 11 – Mar. 27-31                                      | The Geography of Diversification & Regionalization<br><b>Report 1</b>         | Chapter 10 |
| 12 – April 3-7                                       | Reconstructing the Evolutionary History of Lineages                           | Chapter 11 |
| 13 – April 10-14                                     | Reconstructing the History of Biotas  | Chapter 12 |
| <b>Ecological Biogeography &amp; Conservation</b>    |   |            |
| 14 – April 17-21                                     | Island Biogeography<br><b>Report 2</b>  | Chapter 13 |
| 15 – April 24-28                                     | Areogeography, Ecogeography & Macroecology of<br>Continental & Oceanic Biotas | Chapter 14 |
| 16 – May 1-5   | Biogeography of Humanity  | Chapter 15 |
| 17 – May 8-12  | <b>Final Exam</b>   |            |

### Standard SRSU Policy Statements

Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Mary Schwartze, M. Ed., L.P.C., in Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. Telephone: 432-837-8691. E-mail: [mschwartz@sulross.edu](mailto:mschwartz@sulross.edu).

Students enrolled in distance education courses have equal access to the university's academic support services, such as Smarthinking, library resources, such as online databases, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires secure login information to verify students' identities and to protect students' information. The procedures for filing a student complaint are included in the student handbook. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website.